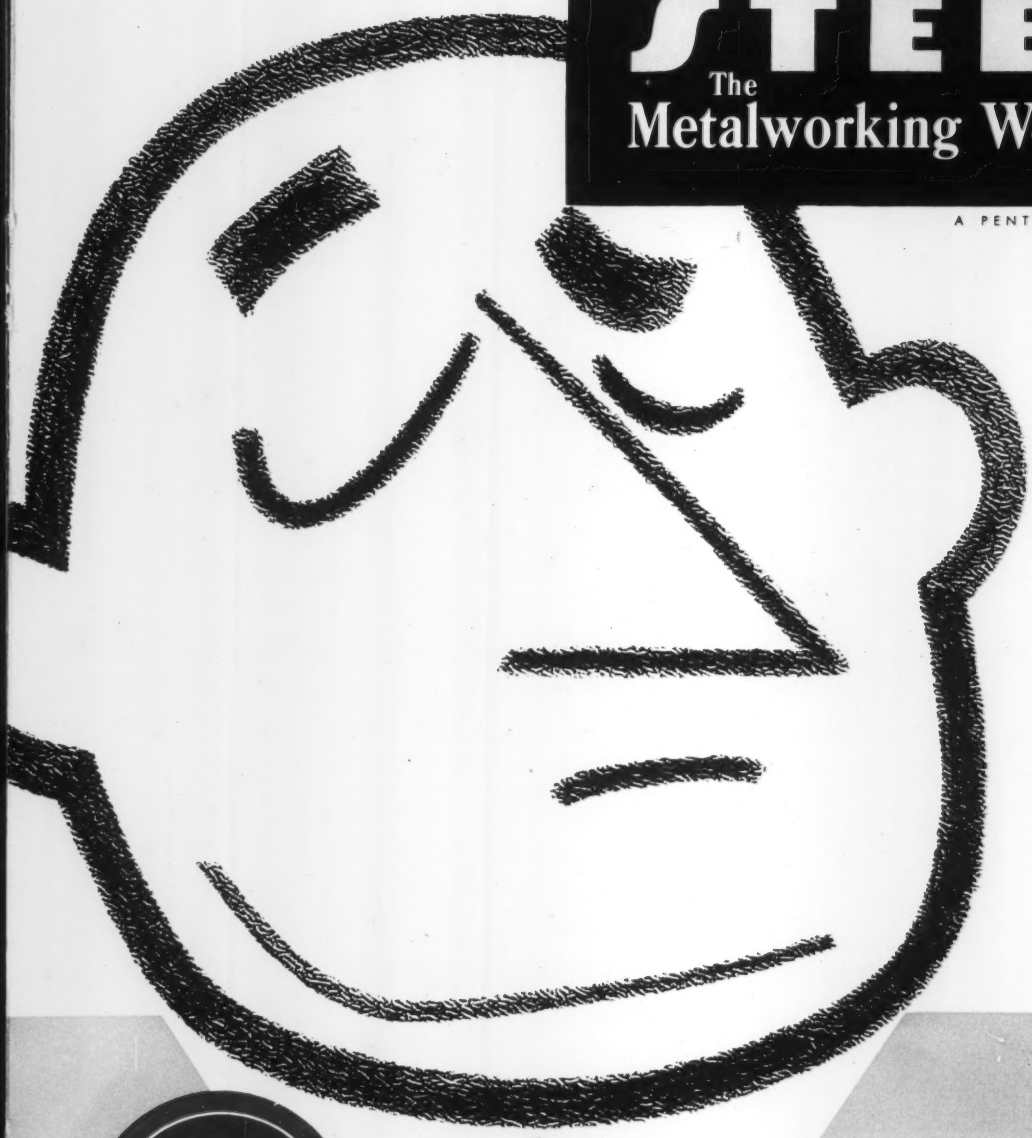
MAY 20, 1957

STEEL
The Metalworking Weekly

A PENTON PUBLICATION



LOCAL 13 UAW

White Collar Drive

Labor's drive to organize office workers falters. But turn to page 95. You'll see there's no cause for complacency.

✔ **Heat Treating Atmosphere Control —page 138**

✔ **Scrap Exports To Level Off in '57 —page 235**

CONTENTS — PAGE 5

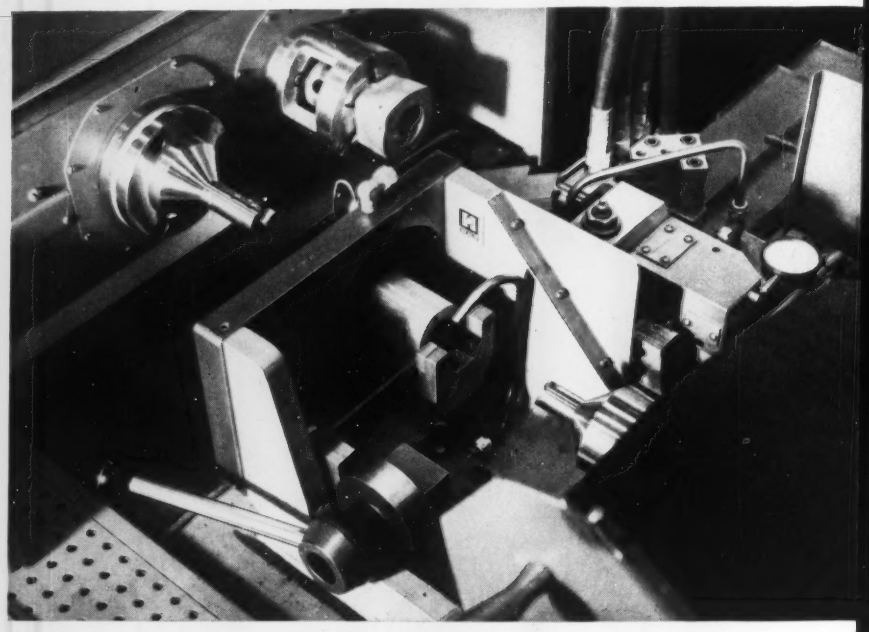
IN ANY MACHINE TOOL OPERATION,

where do you look for the PAY-OFF?

- ☐ On the machine itself
- ☐ In subsequent assembly operations
- ☐ In the finished product

On a Heald BORE-MATIC, pay-off time at the machine is only the beginning!

For example: A manufacturer of portable tools purchased the Model 222 Bore-Matic shown here, for boring and facing various sizes of tool housings. Although results showed a worthwhile time saving of about 20%, this alone was hardly enough to justify the cost of the machine. But analysis of subsequent assembly operations some time later showed substantially reduced assembly times which *fully justified the investment.* Although average Borizing time is only 1 or 2 minutes per piece, the assembly operations take from 30 minutes to 2½ hours and involve as many as five pieces that now fit exactly right because they've been through the Bore-Matic. However, the customer reports that the *major* advantage of the machine is improvement in quality of the finished product. Under previous methods, frequent trouble was encountered due to distortion of metal from improper clamping and locating. So this Heald Bore-Matic not only saved machine time and cut production costs, but also contributed to a *better* and *more saleable product.*



THE *precision production* that you get from a Heald Bore-Matic or Internal Grinder is not an end in itself. Actually, it's the start of a chain reaction that will be felt in subsequent assembly operations and even in the performance and saleability of the finished product as well.

When you measure the length of time it will take for a machine to pay for itself, it's important to look at the *overall* picture. Take the savings you get at the machine. Add the savings from reduced assembly time. And if you can put a dollar value on the resulting improvement in product quality, add this too. You'll find that . . .

IT PAYS TO COME TO HEALD

HEALD®

THE HEALD MACHINE COMPANY

Subsidiary of The Cincinnati Milling Machine Co.

Worcester 6, Massachusetts

Chicago • Cleveland • Dayton • Detroit • Indianapolis • New York

He's cooking up a batch of hammers

A combination of art and a science is the "cookery" of the heat-treater. Here craftsmanship and metallurgy prepare products to meet the most demanding requirements. A case in point: making Stanley Tool's new, all-steel "Steelmaster" hammer.

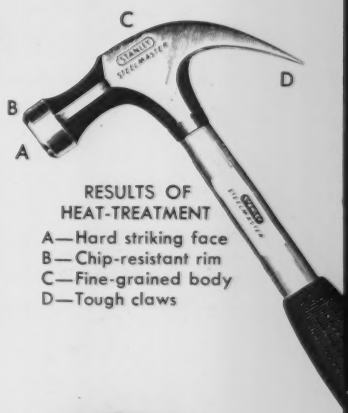
The Stanley people start with forging-quality Bethlehem C-1078 bars. After drop-forging, they anneal the heads to provide for drilling of a socket for the steel handle. The heads are then over-all heated to the proper temperature, oil-quenched and drawn. This refines the grain structure of the entire head, resulting in longer life and resistance to fatigue-cracking.

Then comes the selective heat-treating. First the claws are heated in a lead bath and oil-quenched. Next the face is heated in a lead bath and water-quenched, as shown in the picture. The entire head is then tempered to give the proper combination of hardness and toughness at the face and the claws. Finally, to minimize the possibility of chipping or spalling, the face rims are individually induction-tempered. Every critical area has been scientifically heat-treated.

Proper heat-treatment is vitally important in making many products. But proper material selection is basic in making *every* product. To aid you in this complex problem we recommend our free booklet, "Guide for the Selection of Carbon-Steel Bars." Copies are available at all Bethlehem district sales offices, or address a letter to our Publications Department, Bethlehem, Pa.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation



RESULTS OF HEAT-TREATMENT

A—Hard striking face
B—Chip-resistant rim
C—Fine-grained body
D—Tough claws

BETHLEHEM STEEL

BETHLEHEM STEEL

Old style hand-soldering has been replaced by faster, simpler dip-soldering in this modern plant of Emerson Radio & Phonograph Corporation.

COPPER lets you "print" electric circuits

...mass-producing them at far less cost!

Today's "printed circuit" replaces a maze of complicated wiring. What it is . . . is a thin pattern or circuit of copper affixed to a rigid board (laminated plastic, for example,) or a flexible film.

The copper pattern is obtained by etching, electroplating or stamping. Components to be connected in the circuit are fastened to the board or film by low-cost dip-soldering.

Ask any electronic engineer where *his* industry would be today . . . without the printed circuit!

In television and radio sets, in hearing aids, in automatic signal devices, in guided missiles . . . the lightweight sheet of Copper which replaces hand-wiring has made tremendous contributions.

It has shortened the assembly and inspection time. It has resulted in assemblies becoming more uniform, more reliable, less bulky. It has saved space . . . in product and in plant storage.

And how does it happen you find COPPER in printed circuits?

It's because COPPER possesses precisely the 3 properties needed for this new method of wiring.

First, high electrical conductivity. Second, ease of soldering. Third, capacity for being produced in extremely thin sheets by rolling or plating.

These characteristics of Copper have helped the electronics industry make its recent progress.

They may prove helpful to *your* industry, *your* business, too. Certainly, when such characteristics, such properties, are essential to your product, Copper is essential to your progress. And you can count on an ample supply of Copper for years to come!

COPPER & BRASS
RESEARCH ASSOCIATION
420 Lexington Avenue, New York 17

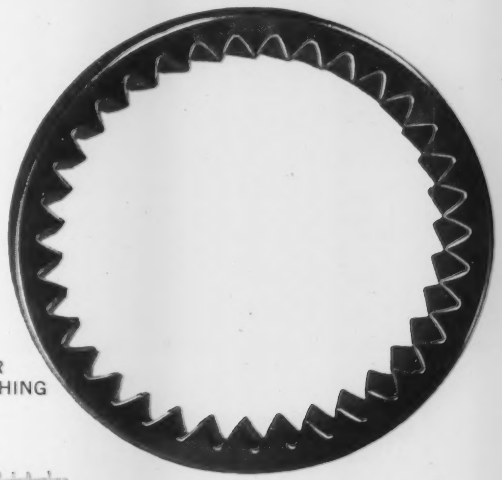
COPPER OR ITS ALLOYS PROVIDE THESE ADVANTAGES: Best conductor of electricity commercially available • Does not rust . . . high corrosion resistance • Best heat transfer agent of all commercial metals • Easy to machine, form, draw, stamp, polish, plate, etc. • Welds readily . . . excellent for soldering and brazing

OSBORN BRUSHING METHODS *worthy of your confidence*

Automated finishing geared to your production

...at rates up to 300 pieces per hour

BEFORE BRUSHING



AFTER BRUSHING

THE automotive pump gears shown above are typical of a wide range of parts that can be precision finished with Osborn's line-production method.

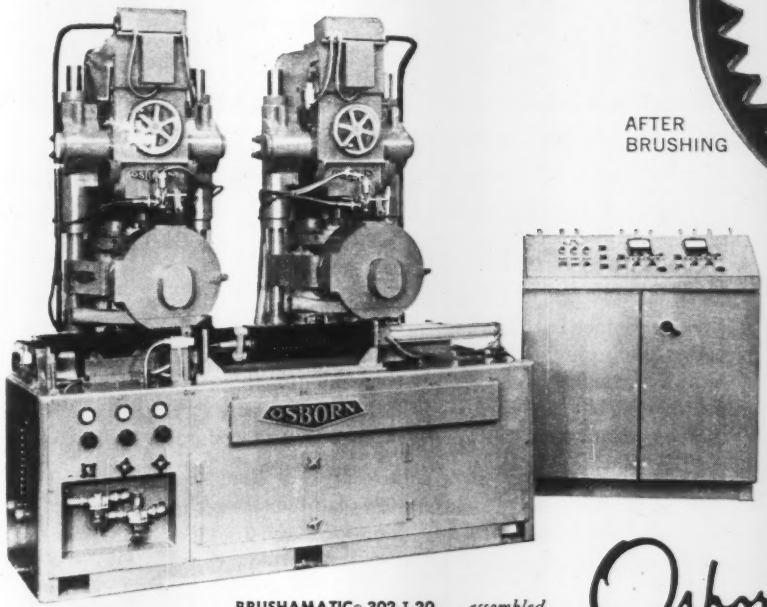
COMPLETELY INTEGRATED . . . Osborn's Automated Brushamatic® Equipment fits right into your production line.

ELIMINATES BOTTLENECKS . . . It is now possible to remove burrs, blend surface junctures, remove scale, clean parts on a continuous line-production basis.

AUTOMATES FINISHING OPERATIONS . . . Takes parts right from your production lines, feeds them to rotating power brushes, delivers them precision-finished to micro-tolerances where necessary.

. . . all without manual handling

Automated power brushing is just one example of the many ways Osborn is helping to improve production techniques. An **O**sborn **B**rushing **A**nalysis, made in your plant without obligation, may point out important benefits to your company. Write *The Osborn Manufacturing Company, Dept. G-55, Cleveland 14, Ohio.*



BRUSHAMATIC® 302-I-20 . . . *assembled from standard Brushamatic components which have been used in various combinations to fill a wide range of finishing requirements.*

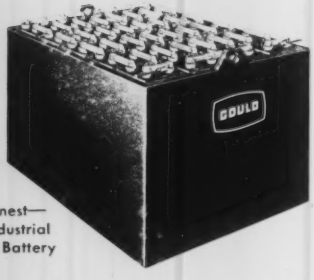
Send TODAY for the new 20-page Brushamatic Booklet

Osborn Brushes

BRUSHING METHODS • POWER, PAINT AND MAINTENANCE BRUSHES • BRUSHING MACHINES • FOUNDRY PRODUCTION MACHINERY

Pheasant hunting in Tacoma, Washington, where many champion field dogs are raised.

Set Your Sights on Longer Battery Life:



America's Finest—
Gould Industrial
Truck Battery

Here's a tip that may help you.

You can reduce battery costs, save your company money and be better able to judge the comparative value of each make of battery, if you simply keep good battery maintenance records. You will extend battery life by consulting these records frequently, thereby assuring the best possible operating procedures.

Why not talk this idea over with your local Gould representative . . . he will give you easy-to-use maintenance record charts. Gould-National Batteries, Inc., Trenton 7, N. J.

Always Use Gould-National Automobile & Truck Batteries

More Power to you from **gould BATTERIES**

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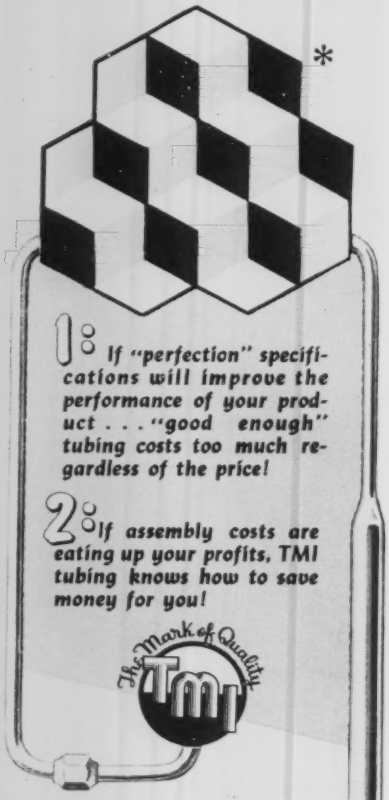
IT PAYS TO TAKE A
"Second Look"
AT THE QUALITY IN THE TUBING YOU'RE USING!



1: If "perfection" specifications will improve the performance of your product . . . "good enough" tubing costs too much regardless of the price!

2: If assembly costs are eating up your profits, TMI tubing knows how to save money for you!

The Mark of Quality TMI

The "second" look is typical of alert management and pioneering engineers. They know by experience that "yesterday's" quality standards leave much to be desired. In the small diameter stainles steel and special alloy tubing field, TMI is setting the pace . . . and serving the best. There's a reason!

*six blocks? seven blocks? ...it depends on your point of view.

TUBE METHODS INC.
Bridgeport Montgomery County, Pa.

MANUFACTURERS • METALLURGISTS • ENGINEERS
SPECIALISTS IN TUBING, .050" to .625" WITH TOLERANCES TO .001" WHEN REQUIRED

behind the scenes

On Local Boards

Every so often salesmen, you know, obey some sort of a flocking instinct. They flutter about a cluster of brass, go through close order drill with their fountain pens and then perch uneasily while the brass exhorts them toward greater effort. Moreover, when sales management has occasion to brief its nervous charges, such briefing must be done carnival style to be reasonably effective.

Wherefore, when it was decided that STEEL salesmen ought to know more about an editorial technique called "Tell-Graphic" . . . (briefly, words, and pictures used in a manner that gives the reader more information in less reading time), Promotion Director Sal Marino suggested that the editors should dramatize the information. "Put on a skit," he said, rolling his eyes in a state of deep feeling. "Let's have action, dialogue, props; put the characters on the stage."

As the writer and director of a warmly received company-produced play a few years back, Sal's enthusiasm soon won editorial support. Associate Managing Editor John Morgan agreed to write the skit, and Art Director Bill Kellogg, Technical Editor Dr. Allen Gray, Morgan and Associate Managing Editor Vance Bell consented to accept parts.

Before they assembled themselves and their props at the sales meeting, where they aimed to make the salesmen hep to "Tell-Graphic," they went through a couple of rehearsals, one of which we caught. We slunk into the room just as Editor Walt Campbell concluded his introductory remarks, and the skit began to unfold.

It began, appropriately enough, when Morgan unfolded his grip from his script, and declared that he had forgotten his opening lines. Kellogg smiled nervously, Bell smiled confidently, and Gray smiled at the thought that at the end of 1 hour he would be back in the privacy of his office.

In a moment, however, Morgan was off, booming along like a Roman senator. Kellogg, who had feared an attack of self-consciousness, snapped up his cues as fast as they were dropped. Bell, the poor man's Robert G. Ingersoll, rose to his part; indeed, in some flights of oratory, he even passed it. Caught in the excitement of the dialogue, Gray uttered his lines so rapidly he not only rushed ahead of himself: He even rushed ahead of the playlet.

While we couldn't resist this opportunity to josh our actors, it must be listed for the record that the skit was remarkably effective. In their unique presentation, Morgan talked about ideas, Kellogg described graphic devices, Bell explained the use and selection of words, and Gray told how the story was wrapped up. As of today, thanks to the presentation in the Morgan manner, STEEL salesmen are undoubtedly better informed on "Tell-Graphic," the dramatic modern publishing technique, than entire fraternities of editors.

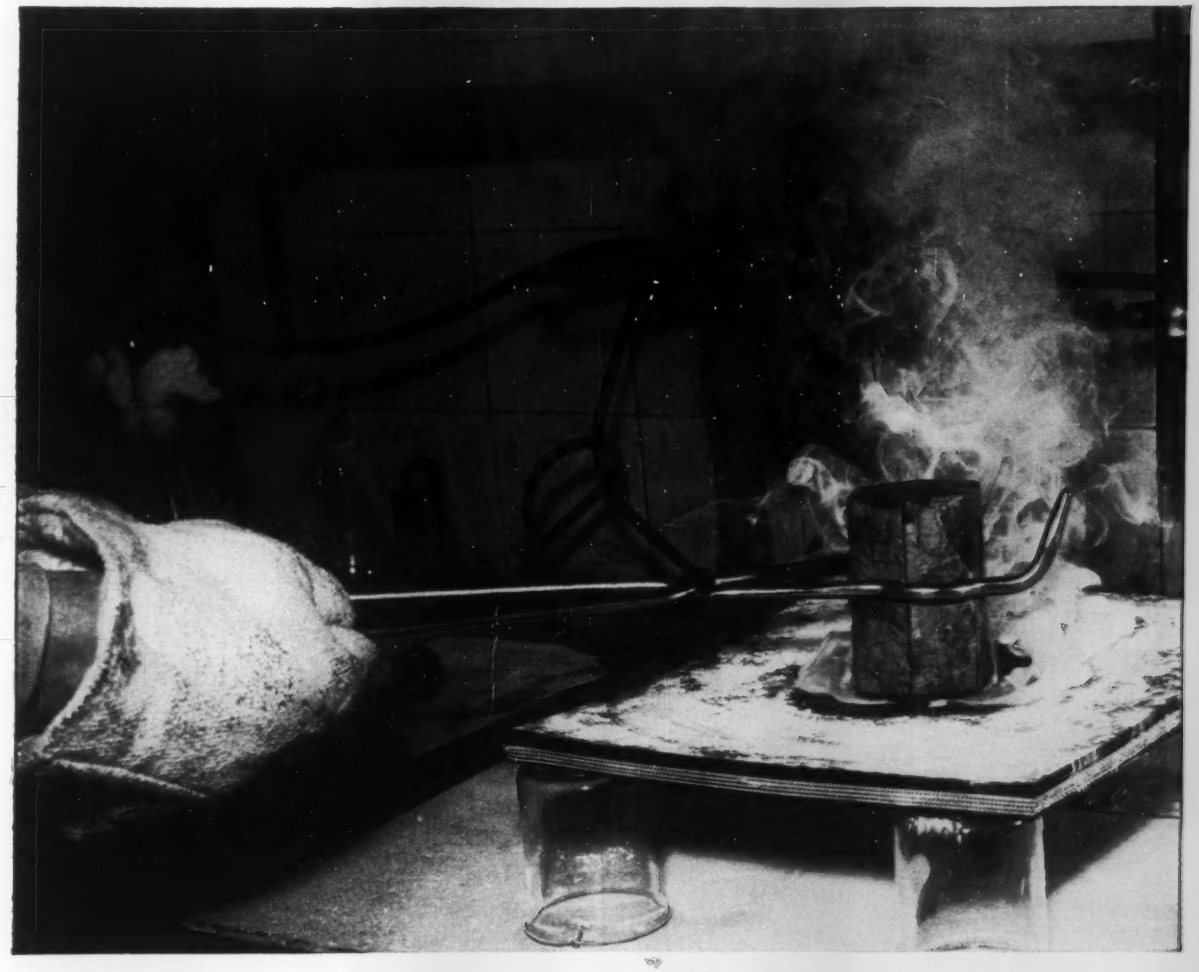
To Tighten White Collars

What should you do when unions attempt to organize your white-collar workers? Head for the hills? Start an extended vacation in King William Land? Pretend the organizers aren't there? Certainly not. You should turn at once to page 95 of this issue of STEEL and read a story based on suggestions made by a group of Chicago executives at a brainstorming session. White-collar people are simply itching to be organized, the unions imply, and where there is an itch, there has to be a scratch, as the old saying goes in one of the Orkney Islands. We used to know a man named Ralph who came from the Orkney Islands; oh, he was a delightful old fellow. One time in Denver . . . hello! We seem to have gotten off the track again. Getting back to unions, their particular targets this year will be companies with many engineers, firms with large clerical staffs, outfits that already have a white-collar union, but unaffiliated with any strong international. Yes, there is going to be plenty of action in union organization drives this year, so you better read up now so you will know which end is up.

Shrdlu

(Metalworking Outlook—Page 89)

B.F.Goodrich



Red-hot metal won't burn through this B.F.Goodrich conveyor belt

New fire curtain means longer life for hot-material belts

SCORCHING chunks of metal that sometimes land on foundry conveyor belts won't burn holes through a B. F. Goodrich conveyor belt with the built-in fire curtain.

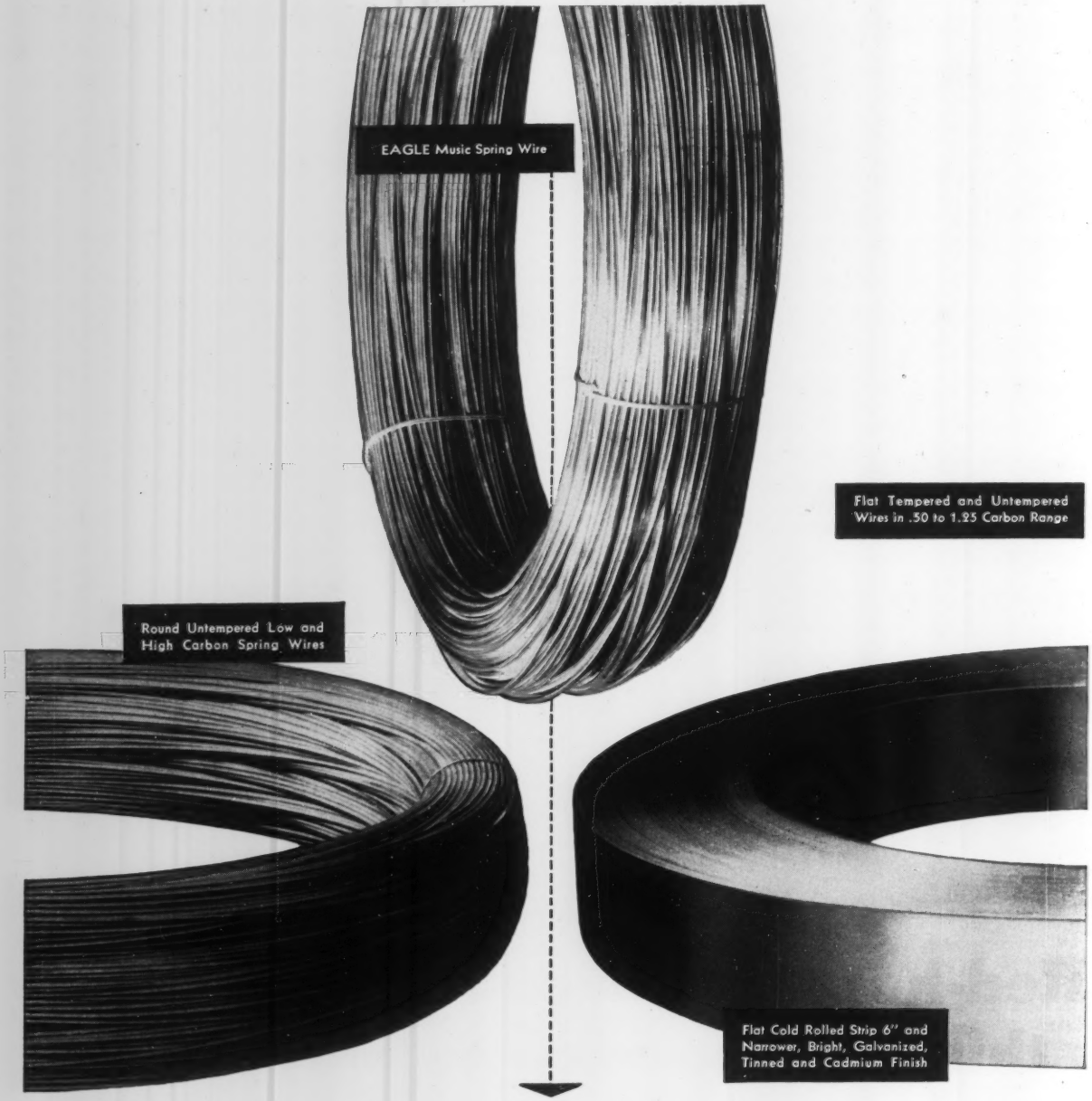
This new protective shield is two layers of glass fabric that B. F. Goodrich puts into the top cover of hot-material conveyor belts. If a hot chunk of metal accidentally drops on the belt, the rubber cover chars at the spot, but only down to the glass fabric fire curtain. Since the hot object doesn't penetrate the glass fabric barrier, the belt keeps its strength and so, of course, lasts longer than belts without this protection.

To demonstrate the effectiveness of the fire curtain, tests were run on two hot-material belts. One belt had the B. F. Goodrich fire curtain protection; the other did not. A red-hot steel bar was placed on each belt. It burned through the rubber covers on both belts. And it burned a hole clear through the unprotected belt. But the B. F. Goodrich fire curtain stopped the burning chunk, so that the body of the protected belt was undamaged.

The fire curtain protection is ideal for foundry service where burnt holes are the major cause of short belt life. It can be built into any B. F. Goodrich hot-material belt. Talk it over with a B. F. Goodrich distributor and see if this new belting improvement is the answer to your hot material problems. *B. F. Goodrich Industrial Products Company, Dept. M-959, Akron 18, Ohio.*

B.F.Goodrich

INDUSTRIAL PRODUCTS


EAGLE Music Spring Wire
Flat Tempered and Untempered Wires in .50 to 1.25 Carbon Range
Round Untempered Low and High Carbon Spring Wires
Flat Cold Rolled Strip 6" and Narrower, Bright, Galvanized, Tinned and Cadmium Finish

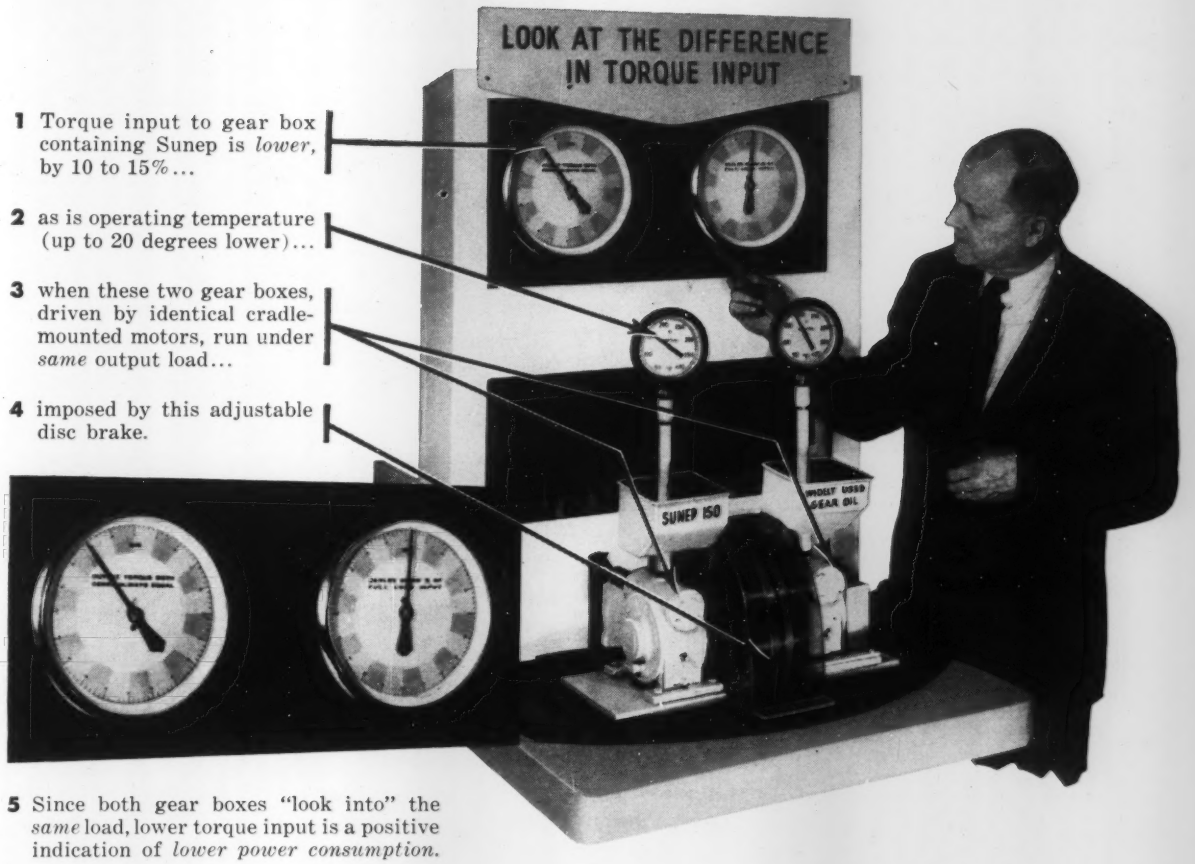
Here is the Washburn Wire Family made to your specifications to insure the Quality of YOUR Product

103

WASHBURN

WASHBURN WIRE COMPANY, NEW YORK CITY

CLEAN, UNIFORM BILLETS–STRIP–RECTANGULAR, ROUND, FLAT RODS
TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES



1 Torque input to gear box containing Sunep is *lower*, by 10 to 15%...

2 as is operating temperature (up to 20 degrees lower)...

3 when these two gear boxes, driven by identical cradle-mounted motors, run under *same* output load...

4 imposed by this adjustable disc brake.

5 Since both gear boxes "look into" the *same* load, lower torque input is a positive indication of *lower power consumption.*

This test rig proves...

SUNEP CUTS POWER CONSUMPTION, REDUCES OPERATING TEMPERATURES

TIME AND AGAIN, under equal operating conditions, Sunep® gear lubricant has demonstrated its superiority over competitive oils. Sunep is a high-quality, extreme-pressure lubricant that is also recommended for screws and heavily loaded bearings.

In addition to extreme-pressure characteristics, Sunep has the ability to combat rust and corrosion. All additives are compatible and do not drop out during use or prolonged storage. These advantages add up to savings in money and equipment for you.

For complete information about Sunep oils, call your Sun representative or write to SUN OIL COMPANY, Philadelphia 3, Pa., Dept. S-5.

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY Philadelphia 3, Pa.

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Point horn, pull trigger, fire's out! That's all it takes to knock out deadly fire with instant-action Kidde dry chemical portable extinguishers! So easy to use, even inexperienced operators get perfect fire-fighting results. Kidde's patented diffuser horn spreads dry chemical powder over wider area for greater fire-killing power. Trigger-release means faster action, feels more natural in the hand. Pick the Kidde dry chemical portable to fit your needs: 5, 10 lb. pressurized (recharged at any commercial air pump), 20, 30 lb. cartridge operated. For more information on dry chemical, carbon dioxide and wet chemical extinguishers, write today for Kidde's P-8 catalog and name of nearest distributor.

Kidde

Walter Kidde & Company, Inc.
560 Main St., Belleville 9, N. J.
Walter Kidde & Company of Canada Ltd.
Montreal — Toronto

LETTERS
TO THE EDITORS

Trend to Magnesium

Your article, "Helicopter Orders Soar" (Apr. 1, page 59), was a fine story about a thriving young industry.

We particularly liked your statements in reference to Sikorsky, since it is one of magnesium's largest aircraft industry customers. STEEL correctly reported the use of magnesium castings in the Sikorsky models. What it didn't report is that Sikorsky helicopters use from two to five times as many pounds of magnesium wrought products as castings.

If, as STEEL reports, the helicopter industry is increasing its consumption of steel and aluminum—it is increasing its consumption of magnesium geometrically. That, of course, is a point we wish the article might have made.

William M. Cox
Public Relations Department
Dow Chemical Co.
Midland, Mich.

Just What the Doctor Ordered

Please send two copies each of the three articles already published in your 1957 Program for Management. They are on management development and profit sharing.

This series of articles is the fulfillment of the doctor's prescription—as compared with the numerous texts of pure theory, or the vast accumulation of sketchy periodical articles. As you may detect, you have one appreciative reader.

S. L. Gale
Factory Engineer
Factory Planning
Transformer Division
Westinghouse Electric Corp.
Sharon, Pa.

Valuable Contribution

Kindly send us a dozen copies of your article, "What Makes a Good Deep Drawing Steel?" (Apr. 22, page 78). This is a valuable contribution, especially the chart on General Motors Standards of Cold-Rolled Sheet Steel for Drawing. We want to distribute it to our production and sales staff.

I. Zivian
Branch Manager
Reliance Steel Division
Detroit Steel Corp.
Detroit

Seasonal Trend in Steelmaking?

My motto is: When you want information pertaining to steel, go to STEEL magazine. So here I am again.

In the Business Trend column each week, you chart your industrial produc-

(Please turn to page 12)

HOW TO LAND A PRIZE CATCH

If you're casting about for ways to save money and increase your production, then you'll land a prize catch when you hook-on to CIMCOOL°—the radically new and different cutting fluid. Here are just three reasons why you'll want to net CIMCOOL Concentrate:

- **CIMCOOL LOWERS COSTS** because it's longer lasting in machines. Thus, it reduces downtime and cuts labor costs for cleaning and changing.
- **CIMCOOL DOES A BETTER JOB** because of its chemical lubricity. It permits faster speeds and feeds, for it combines friction reduction and cooling capacity in a degree never before attained by old-fashioned coolants.
- **CIMCOOL IS CLEAN,** doesn't soil clothing or hands. It contains no skin irritants. It leaves no slippery film on shoes, floors, machine or work. It can't smoke, can't burn, and virtually eliminates rancidity and foul odors.

So, cast a line in the direction of your CIMCOOL Distributor. He'll give you complete information on CIMCOOL Concentrate— and the entire family of CIMCOOL Cutting Fluids. Or contact us direct. We'll have one of our Cincinnati Milling-trained machinists call on you—without cost or obligation. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

CIMCOOL CUTTING FLUIDS

CIMCOOL **Concentrate**—The famous pink fluid which still covers 85% of all metal cutting jobs. Effective, economical and clean.

CIMCOOL **Tapping Compound**—Permits the use of highest tapping speeds and increases tap life amazingly.

CIMPLUS The transparent grinding fluid with exceptional rust control. Also used for machining cast iron and as a water conditioner with CIMCOOL Concentrate.

CIMCUT **Concentrates** — For jobs requiring oil-base cutting fluids. Added to mineral oils, they give economical mixes for higher speeds and feeds.

CIMCOOL **Bactericide** — The most effective agent yet developed to overcome rancidity and foul odors.

CIMCOOL **Machine Cleaner** — The two-phase non-corrosive cleaner that removes grit, dirt, slime and oil.

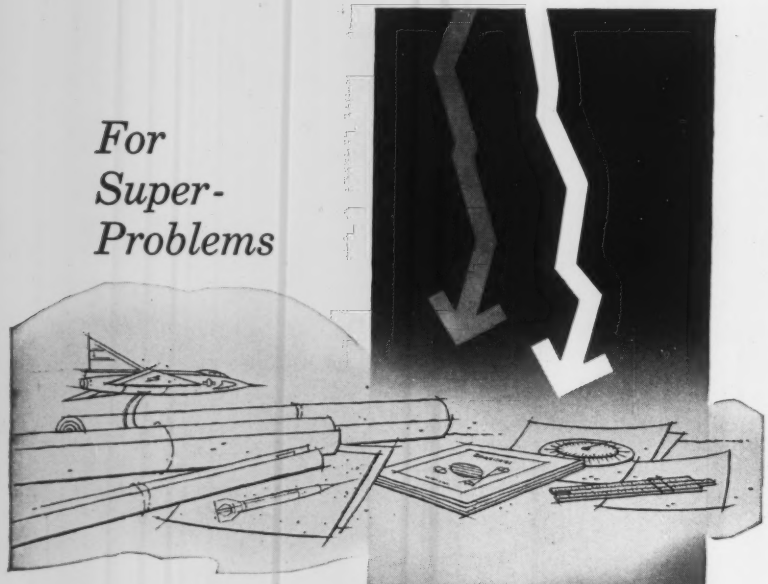
°Trade Mark Reg. U.S. Pat. Off.

CIMCOOL Cutting Fluids

for 100% of all metal cutting jobs

PRODUCTION-PROVED PRODUCTS OF THE CINCINNATI MILLING MACHINE CO.

For Super-Problems



SUPER METALS by

WALLINGFORD

Whether the need is for vital aircraft parts that must withstand the searing heat of today's planes or those still on the drawing board . . . or for equipment used in handling acids and other corrosives throughout industry, Wallingford Steel is meeting the challenge successfully.

Constantly searching for new metals, new methods, Wallingford has long engaged in research and experimentation with high-strength, corrosion-resistant, high-temperature alloys. Research, too, has played a large part in enabling Wallingford to produce the quality stainless steel strip and tubing necessary to meet the rigid requirements of today's applications.

Wallingford's progress aids your progress! Write for further information that can help you solve the problems of today . . . and tomorrow!

WALLINGFORD STEEL CO.

THE WALLINGFORD STEEL CO.

WALLINGFORD, CONN., U.S.A.

Progress in Metals for over 35 Years

COLD ROLLED STRIP: *Super Metals, Stainless, Alloy*
WELDED TUBES AND PIPE: *Super Metals, Stainless*

LETTERS

(Concluded from page 10)

tion index on a yearly basis. Can you furnish a long range chart on steel operations? We want to see if there is a seasonal trend.

Marion G. Reisner
Purchasing Agent
Adams Co.
Dubuque, Iowa

• *We are forwarding a chart showing the week-to-week production of steel in the nation, which is brought up to date in the Market Outlook each week. It shows all of 1956 and 1957 to date.*

Seasonal patterns have not been as pronounced as effects of steel strikes and inventory building or reduction. For example, the big dips in 1956 and 1955 were the results of steel strikes. Some people believe we may see more of the seasonal effects this year than we have for some time.

Training Director Likes Article

I have just finished reading the Apr. 8 issue and think the article, "How To Train Foremen" (page 64), is excellent. Please send a reprint.

R. R. Letsch
Director of Training
John Deere Waterloo Tractor Works
Deere Mfg. Co.
Waterloo, Iowa

Plastic Industrial Wheels

On your Technical Outlook page of Feb. 18, I noticed an item about plastic wheels. Could you give us the address of the company making them?

Moore Vaughn
Central States Steel Inc.
Kansas City, Mo.

• *The Fairbanks Co. is located at 395 Lafayette St., New York 3, N. Y.*

Most Useful Handbook

Recently I came in contact with a booklet printed by you entitled, "Guide for Selecting Tool Steels & Carbides" (insert in Mar. 12, 1956, issue). I would like a copy for myself. This has struck me as being one of the most useful handbooks I have seen for quite some time.

Thomas S. Kois
Suburban Metalcraft Inc.
Des Plaines, Ill.

Engineer Lauds Bearings Story

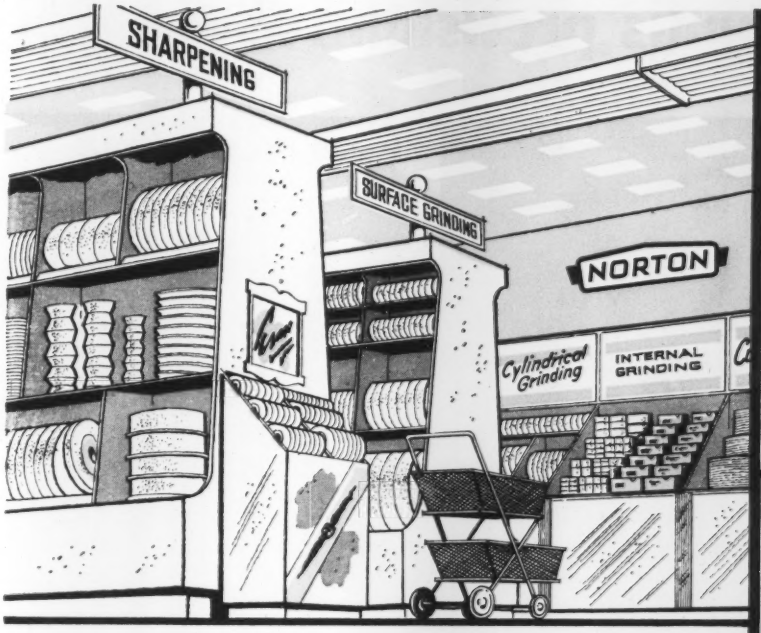
The article, "Bearings for Tough Jobs" (Apr. 8, page 114), covers the subject in a concise and interesting manner. I would like three reprints.

M. Yontar
Research Engineer
Edison Laboratory
Thomas A. Edison Industries
West Orange, N. J.

Helpful, Enjoyable Reading

Thank you for your reprint of the article, "Management Development—The Care and Feeding of the Junior Executive" (Feb. 11, page 93). I am a recent college graduate and, since entering the steel industry, have found the reading of STEEL quite helpful and enjoyable.

William J. Regan III
Pittsburgh Steel Co.
Pittsburgh



Here's your SUPER-MARKET for tool room grinding wheels

Norton makes wheels for every tool room job . . . precision-built for "TOUCH of GOLD" uniformity

"Everything under one roof" is the modern super-market advantage you get with Norton wheels — the world's largest line, with exactly the right wheel for every tool room grinding job you do.

Norton wheels are precision processed to duplicate wheel balance and structure with precise uniformity.

To you, this means wheel after wheel and lot after lot will grind alike — with the same time-and-money-saving "Touch of Gold" performance.

And remember: only Norton offers you such long experience in both grinding wheels and grinding machines to help you produce more at lower cost. For aid in wheel selection and helpful booklets on tool room operations, see your Norton Distributor. Distributors in all industrial areas, listed under "Grinding Wheels" in your phone directory, yellow pages. Behr-Manning Company, Troy, N. Y., division of Norton Company. *Export:* Norton Behr-Manning Overseas Incorporated. **For the booklets or other information write to Norton Company, Worcester 6, Massachusetts.**

W-1761

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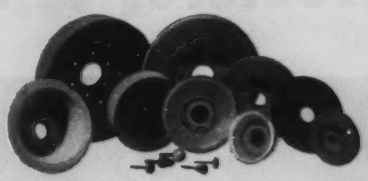
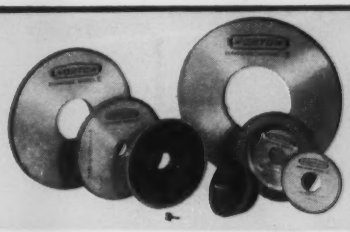
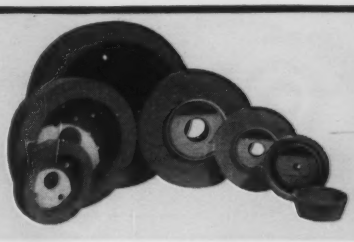


NORTON G BOND AND BE BOND WHEELS bring you the most efficient vitrified bonds ever developed for precision and semi-precision grinding. For sharpening and for surface, cylindrical and internal grinding on all steels and cast alloys use G Bond or BE Bond Wheels in 32 ALUNDUM*, 38 ALUNDUM, 19 ALUNDUM, or the new non-premium priced 44 ALUNDUM abrasive.



NORTON DIAMOND WHEELS for carbide grinding are backed by long leadership in diamond wheel development and manufacture. The regular B resinoid bond is ideal for wet grinding — the B6 resinoid bond for dry grinding.

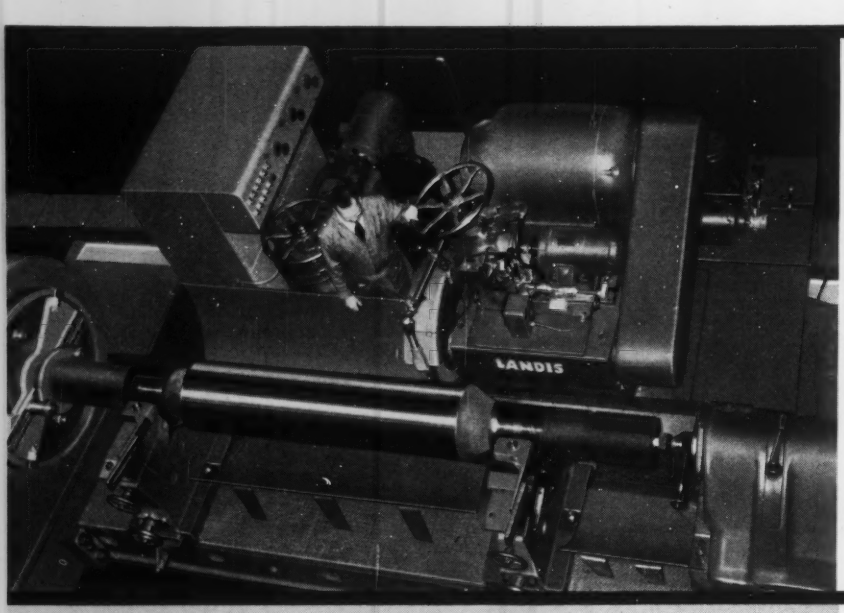


NORTON K BOND WHEELS IN CRYSTOLON* abrasive are often the best investment for many carbide grinding jobs. The vitrified K Bond comes in half-grade increments of hardness, enabling you to "pin-point" your specifications.

BOOKLETS THAT TELL YOU ALL. *A Handbook on Tool Room Grinding* is over 200 pages long and crammed with facts it will help you to know. *How To Select Wheels For Precision Grinding Tool And Constructional Steels* shows the way to correct wheel selection. Get these from your Norton Distributor or write to the nearest District Office of Norton Company, Worcester 6, Massachusetts.

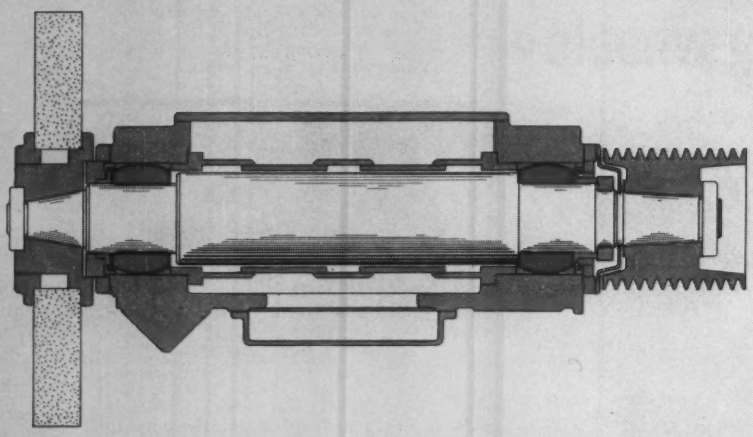
*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

Features of Landis precision roll grinders



Conveniently grouped controls

Less operator fatigue and shorter setup time result from convenient positioning of operating controls. Full view of grinding wheel and roll from operating position.



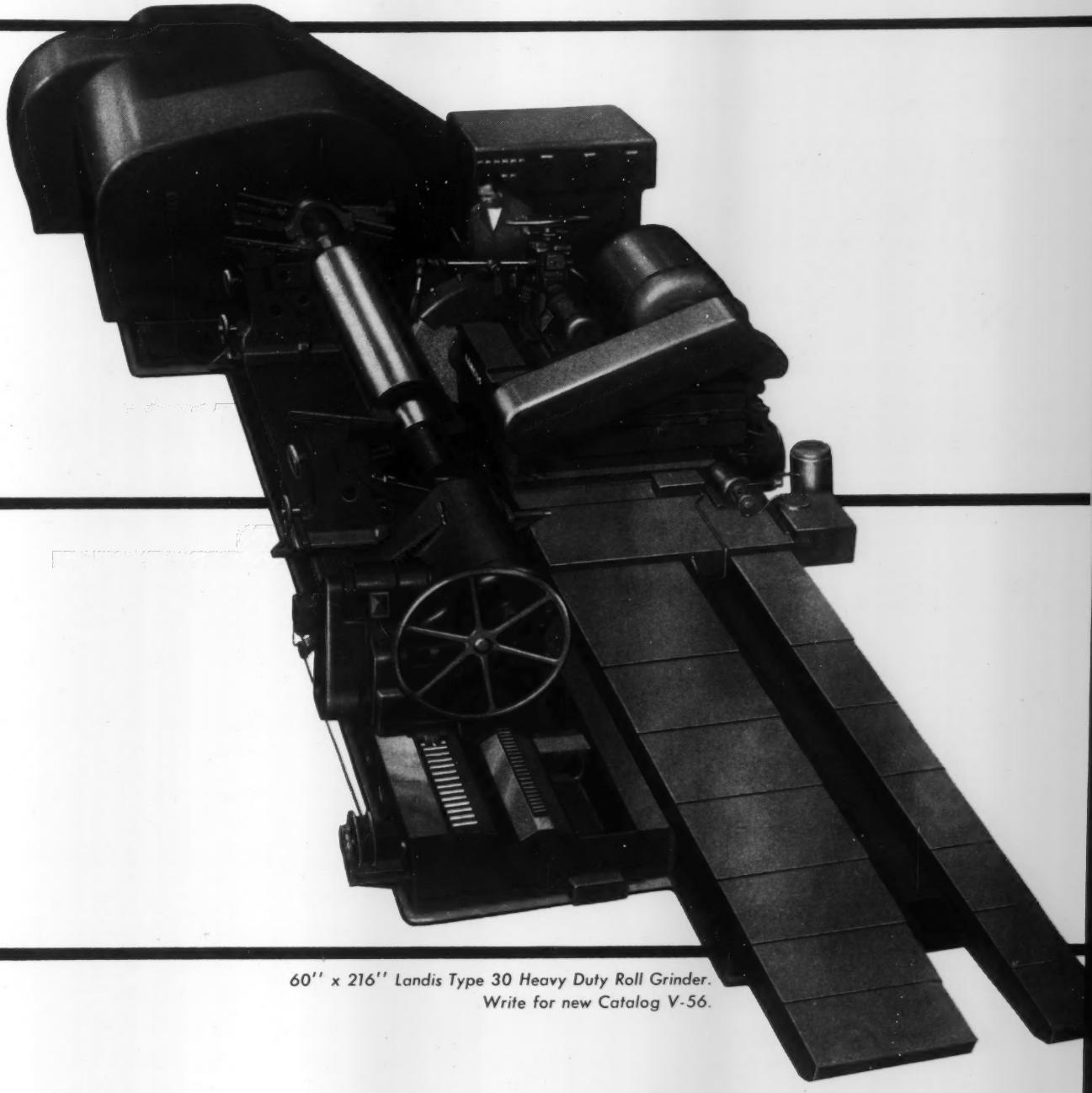
Exclusive Microsphere bearings

Close running clearance of Landis Microsphere spindle bearings plus "rigidized" wheel spindle, with increased diameter between bearings, permit heavy cuts and fine finishes.

Reserve power for heavy work

Ample horsepower for both wheel drive and roll drive, combined with massive rigid construction of machine, permits easy starting of rolls and heavy roughing cuts.

reduce grinding time . . . cut costs



60'' x 216'' Landis Type 30 Heavy Duty Roll Grinder.
Write for new Catalog V-56.

LANDIS
precision grinders

LANDIS TOOL COMPANY / WAYNESBORO, PENNSYLVANIA

CHILE	COLOMBIA	PERU	ARGENTINA
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24 NATIONS UNITED...

on Choice of Yoder Mills for Pipe and Tube Manufacture

It all started less than two decades ago with the introduction by Yoder—and the rapid adoption by American industry—of a revolutionary new type of mills for cold forming and electric-resistance welding of pipe and tubing. England, France, Italy, Mexico, Argentina, and Brazil soon followed the U.S.A. in adopting these mills. Other countries boasting any kind of modern metal working industry did likewise, even including distant Japan, India and South Africa. Production, depending on requirements, varies from 25,000 up to 75,000 feet per 8-hour shift.

●

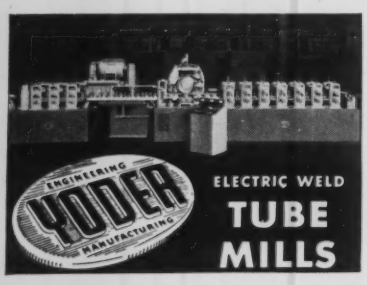
By this time, England, Italy and Argentina each have a total of ten Yoder mills in operation; Brazil, eight; Mexico, six; France, five; other nations somewhat in proportion to their population. In many nations, Yoder mills now supply from 50% to 90% of all welded tubes used. Several oustanding production records have been scored by operators in foreign countries, most recently in Italy. Reasons: the simplicity of design, ease of operation and dependability of Yoder mills. Secondly, generous assistance rendered by Yoder in training operators everywhere.

●

Through technological advances, Yoder leadership in tube mill design has been jealously maintained and strengthened from year to year. Ask for literature giving details of the latest improvements. Correspondence invited.

THE YODER COMPANY

5502 Walworth Ave. • Cleveland 2, Ohio, U.S.A.



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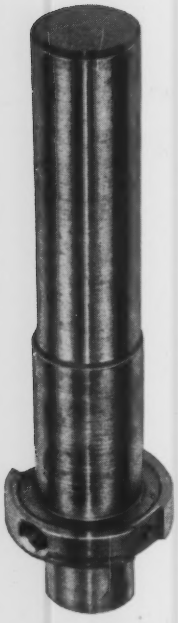


how to spin a good yarn

The happy ending comes quickly when Avey machines are in the story, as the makers of this textile spindle base discovered. Savings in production time, direct labor, and plant space will probably return their equipment investment in a single, solitary year.

What makes Avey machines such high-yield investments? For one thing, they're generally simple assemblies of basic components on which the engineering has largely been paid for. Costs are lower; the price becomes more favorable; the savings per part, or per hour, pay off the investment sooner.

For another: we take our own medicine. You'll find most of the machines in our shop young, and shiny, and productive.

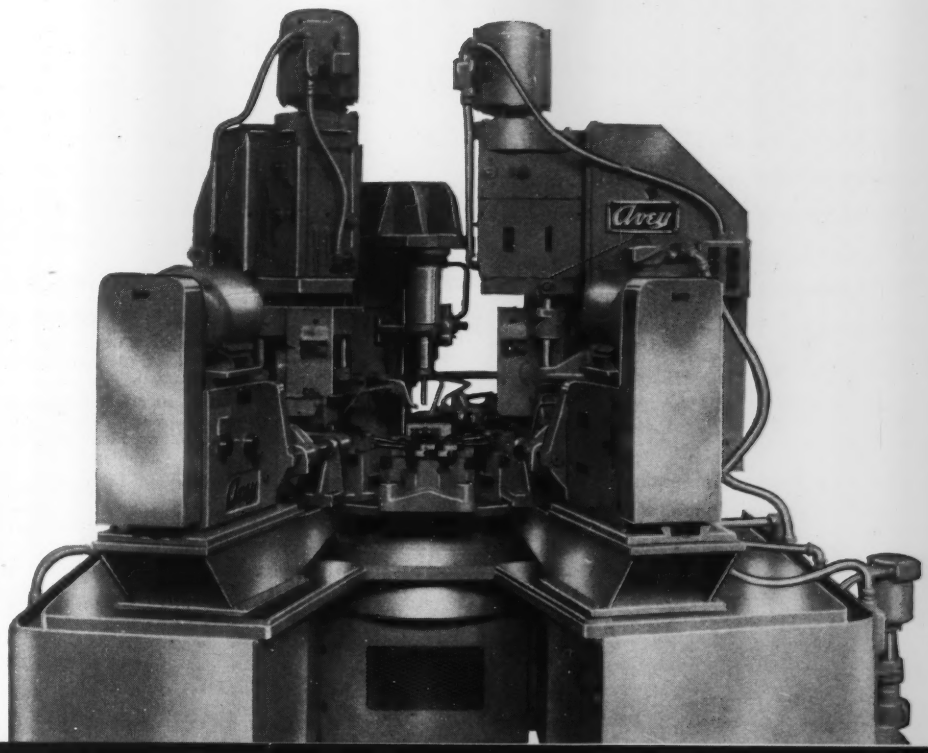
▸ **production data:** This 6-station Avey indexing machine performed drilling, tapping, milling, and broaching operations. Fixtures arranged to handle two different parts. Milling and broaching done in one pass, with cycle time of 8 seconds. Rate: 380 parts/hr. at 100% efficiency.

THE AVEY DRILLING MACHINE CO., CINCINNATI 1, OHIO

drilling, tapping, production machines

with a happy ending

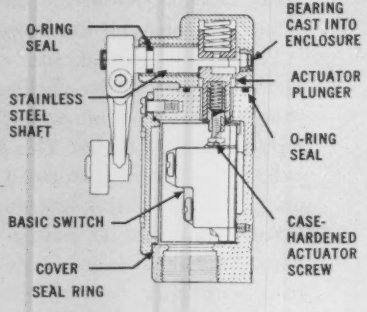
Avey



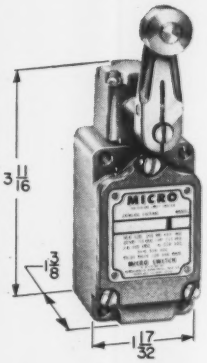
MICRO SWITCH . . . FIRST IN PRECISION SWITCHING

Seals Give Maximum Protection

Sealing is provided by use of O-ring seals on the actuator shaft and between the actuator head and the housing. A synthetic rubber ring seal is provided for the cover. These seals provide maximum protection against the entrance of dust, lint, oil and other liquids.



Moving Parts Completely Sealed

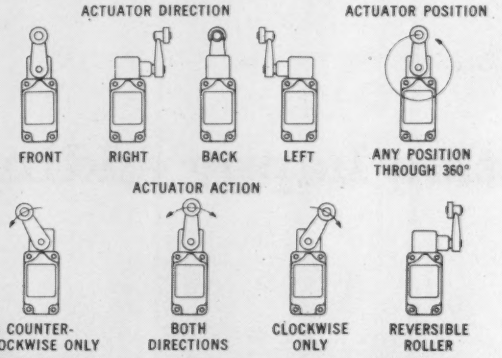


All moving parts and the switching chamber are completely sealed—protected from wear or becoming fouled. Two-circuit double break contact arrangement allows flexibility in circuit design. Roller arm actuators are of forged aluminum alloy—give utmost resistance to shock and vibration.

These MICRO SWITCH "LS" precision limit switches can be your answer to MORE PRODUCTIVE operations

Easy to mount . . . easy to install . . . reliable in operation . . . these small, versatile, two-circuit switches meet today's demand for more automatic processes

Send for Catalog 83 for full information



Field adjustable to any position

The roller arm actuator is field adjustable through 360°, positively locking at any position. Actuators are assembled to operate in either direction or in one direction only, clockwise or counter-clockwise by removing the actuator head and rotating the notched plunger 90°. The head may be rotated to permit actuation from any of four quadrants.

SWITCH CHARACTERISTICS:

Operating force—3 lbs. max.; Pretravel—20° max.; Full overtravel force—6 lbs. max.; Differential travel—12° max.; Release force—½ lb. min.; Overtravel—30° min.

ELECTRICAL RATING: 10 amps. 120, 240, 480 v ac; ½ H.P. 120 v ac; 1 H.P. 240 v ac; .8 amp. 115 v dc; .4 amp. 230 v dc; .1 amp. 550 v dc. Pilot duty rating 600 v ac, max.

Write for the name of the MICRO SWITCH distributor nearest you. Field engineering service is available at your nearby MICRO SWITCH Branch office.

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Low cost and high chromium recovery with a minimum of objectionable fumes and flames are some of the outstanding qualities of EXOKROM.

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Producers of alloys, metals and chemicals

60 CYCLE INDUCTION MELTING

Melting metals in the 60 cycle induction furnace will bring greater economy and quality to your melting and casting operations. Whether you produce zinc or aluminum die castings, brass or bronze castings, ductile iron castings, or aluminum extrusions — to name but a few fields — there is an induction furnace to do your job.

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AJAX ENGINEERING CORPORATION has specialized in just this one field: building the best and most efficient 60 cycle induction melting furnace for the job. As pioneers of this melting principle we have accumulated considerable experience in each field of application.

AJAX induction furnaces have been instrumental in establishing new metallurgical processes such as continuous casting, continuous galvanizing, and aluminum coating of steel. Exclusive AJAX developments are the electromagnetic pump and the AJAXOMATIC for controlled pouring.

AJAX 60 cycle induction melting furnaces range in size from 20 kw to 2000 kw, produce from 150 pounds per hour up to 40 tons per hour.

MAY WE HAVE YOUR INQUIRY?

ajax

ENGINEERING CORPORATION

TRENTON 7, NEW JERSEY

Associated Companies: Ajax Electric Company · Ajax Electrothermic Corp.

CALENDAR
OF MEETINGS

May 20-23, American Society of Mechanical Engineers: Oil and gas power conference, Kentucky hotel, Louisville. Society's address: 29 W. 39th St., New York 18, N.Y. Secretary: C. E. Davies.

May 20-23, Design Engineering Show: New York Coliseum, New York. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N.Y.

May 21-24, Machinery Dealers National Association: Annual meeting, Grossinger's hotel, Grossinger, N.Y. Association's address: 1346 Connecticut Ave. N.W., Washington 6, D.C. Executive director: R. K. Vinson.

May 22-23, American Iron & Steel Institute: Annual meeting, Waldorf-Astoria hotel, New York. Institute's address: 150 E. 42nd St., New York 17, N.Y. Secretary: George S. Rose.

May 22-24, American Society for Quality Control: Annual convention and exposition, Masonic Temple, Detroit. Information: Andrews, Bartlett & Associates Inc., 1849 W. 24th St., Cleveland 13, O.

May 26-29, National Association of Purchasing Agents: Annual meeting, Convention Hall, Atlantic City, N.J. Association's address: 11 Park Place, New York 7, N.Y. Secretary: George A. Renard.

May 27-28, American Institute of Steel Construction Inc.: Engineering conference, Edgewater Beach hotel, Chicago. Institute's address: 101 Park Ave., New York 17, N.Y. Executive vice president: L. Abbett Post.

May 28-29, American Institute of Mining, Metallurgical & Petroleum Engineers Inc.: Reactive metals conference, Ambassador hotel, Los Angeles. Institute's address: 29 W. 39th St., New York 18, N.Y. Secretary: E. O. Kirkendall.

June 2-7, Society of Automotive Engineers: Summer meeting, Chalfonte-Haddon Hall, Atlantic City, N.J. Society's address: 485 Lexington Ave., New York 17, N.Y. Secretary: John A. C. Warner.

June 2-5, American Gear Manufacturers Association: Annual meeting, Homestead, Hot Springs, Va. Association's address: One Thomas Circle, Washington 5, D.C. Executive secretary: John C. Sears.

June 2-6, Air Pollution Control Association: Annual meeting and exhibit, Jefferson hotel, St. Louis. Association's address: 4400 Fifth Ave., Pittsburgh 13, Pa. Executive secretary: Harry C. Ballman.

June 3-5, American Management Association: General management conference, Hotel Statler, New York. Association's address: 1515 Broadway, New York 17, N.Y. Secretary: Andrew P. Donovan.

June 3-7, American Society of Civil Engineers: National spring convention, Hotel Statler, Buffalo. Society's address: 33 W. 39th St., New York 18, N.Y. Executive secretary: William H. Wisely.

June 4-7, National District Heating Association: Annual meeting, Homestead, Hot Springs, Va. Association's address: 827 N. Euclid Ave., Pittsburgh 6, Pa. Secretary-treasurer: John F. Collins Jr.

June 9-12, National Industrial Advertisers Association: Annual meeting, Waldorf-Astoria hotel, New York. Association's address: 271 Madison Ave., New York 16, N.Y. President: John C. Freeman.

June 9-12, National Metal Trades Association: Western plant management conference, Dell View hotel, Lake Delton, Wis. Association's address: 337 W. Madison St., Chicago 6, Ill. Secretary: Charles L. Blatchford.

June 9-13, American Society of Mechanical Engineers: Semiannual meeting, Sheraton-Palace hotel, San Francisco. Society's address: 29 W. 39th St., New York 18, N.Y. Secretary: C. E. Davies.

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Looking for the world's most complete stock of 52100 steel tubes and bars? You've come to the right spot . . . . . .

PETERSON STEELS, INC.
Union, New Jersey
Detroit, Michigan Chicago, Illinois

Does your **Cylindrical** *problem call for a* **Centrifugal** *solution?*

If your product plans call for hollow cylindrical parts, give some thought to these facts. Manufacturers who had never seriously considered cast parts before are discovering important advantages in Sandusky centrifugal castings.

They're getting exceptional resistance to heat, corrosion, abrasion and stress, through the use of special alloys cast centrifugally . . . in diameters from 7" to 54", and lengths to 33 feet depending on diameter . . . and specially machined to specifications.

How can our versatile staff and facilities help you? Tell us your product requirements. Let us explore your ideas. Perhaps we can help solve your cylindrical problems through the vast foundry experience, metallurgical research and machining skills our 46 years offer.

Your request will bring more information promptly . . . or, if you prefer, a personal call by one of our engineers. Sandusky Foundry and Machine Company—Sandusky, Ohio.

Sandusky centrifugal castings offer you 4 important advantages:

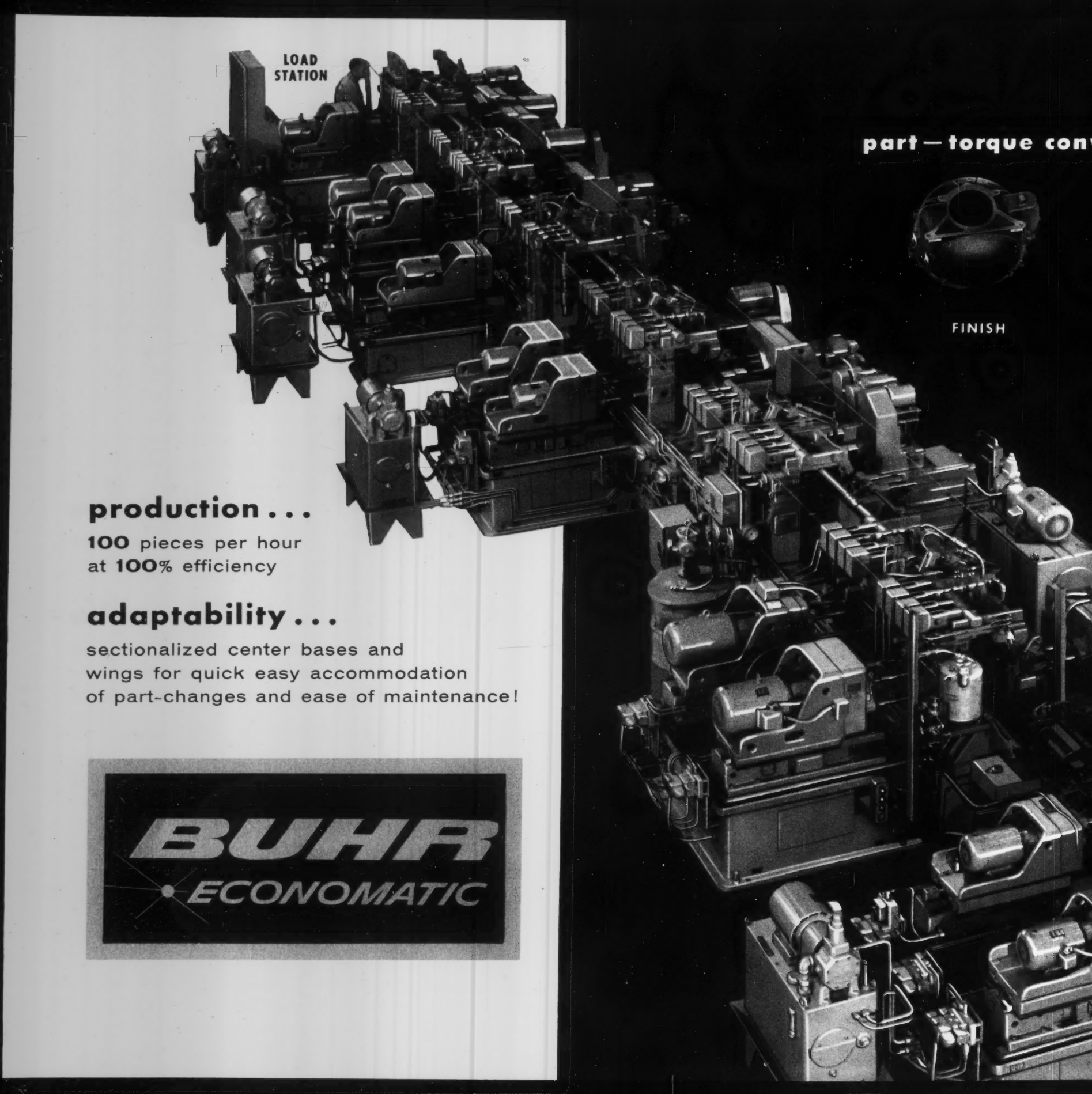
1. ***SUPERIOR STRENGTH***—through non-directional mechanical properties
2. ***BETTER QUALITY***—machined castings are porosity-free
3. ***UNIFORM SOUNDNESS***—harmful inclusions are forced out by spinning motion
4. ***JOB-READY FINISHED CASTING***—reach you machined exactly to your specifications . . . eliminating extra costs from rejects, down-time, loss of production, etc.

See Our Booth #1339 at the Design Show

Sandusky Centrifugal Castings

Stainless steels—plain carbon and low alloy steels—wide variety of copper base compositions

sets
precedent in
production
adaptability



production . . .

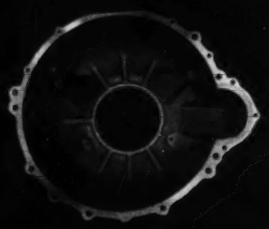
100 pieces per hour
at **100%** efficiency

adaptability . . .

sectionalized center bases and
wings for quick easy accommodation
of part-changes and ease of maintenance!

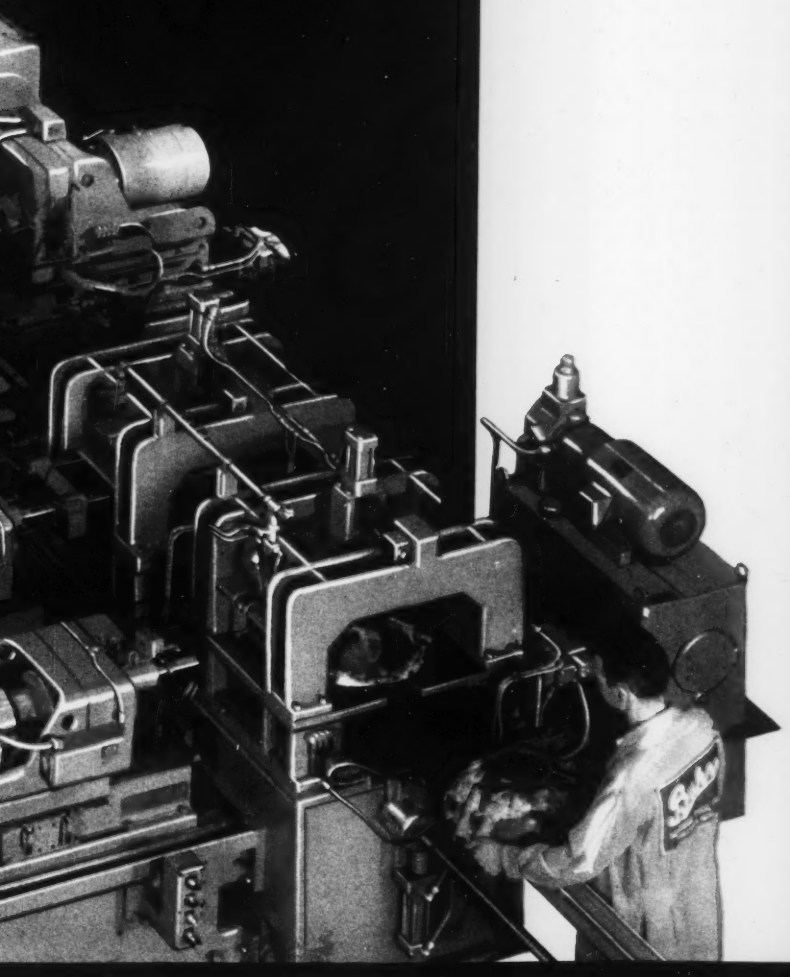
BUHR
ECONOMATIC

nverter housing



FINISH

performs 90 operations each on two different converter housings . . . 27 drilling, 15 chamfering, 17 tapping, 3 milling, 3 rough-boring, 3 precision-boring, 3 precision-gauging and 15 probing



pace-setting features

ADAPTABILITY . . . Buhr pioneered interchangeability of bases and parts, plus the clean design to provide ample areas between stations (as may be noted in photo at left). This means 3-way economy—easier adaptation to part-changes, easier maintenance and less down-time.

INTERMITTENCY . . . takes either of two housings with uncommon hole-locations and processes them intermittently!

BI-METAL ACCOMMODATION . . . each spindle-head is equipped with change-gear boxes for accommodating either cast iron or aluminum parts!

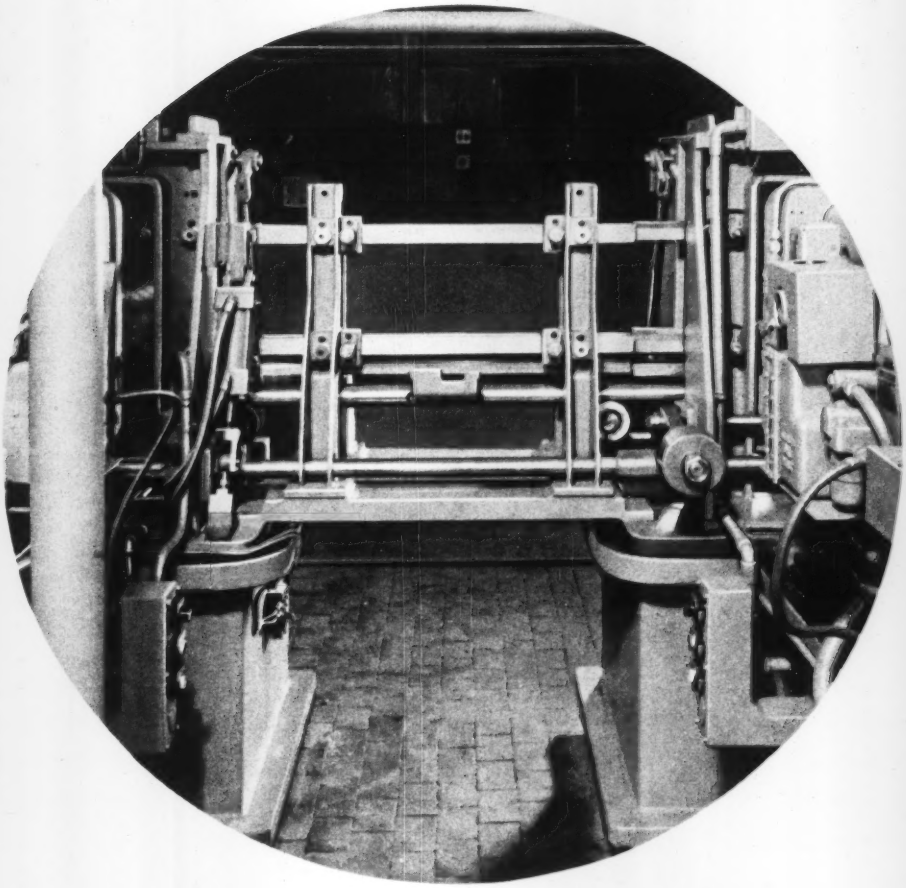
standard features

- automatic lubrication of all moving parts
- mist-lubrication to all spindles to maintain uniform temperature in heads
- all spindles arranged for pre-setting of cutting tools to minimize downtime for tool changes
- hardened-and-ground automatically-lubricated steel ways
- standard and special parts interchangeable for ease of maintenance
- J.I.C. Standards throughout

BUHR MACHINE TOOL CO.®

ANN ARBOR, MICHIGAN

Solidly Engineered • Precision Built • for World's Leading Manufacturers



BUHR ECONOMATIC

setting the pace in production adaptability

by clean sectionalization in

ECONOMATION

"ECONOmical autoMATION"

You have to move fast

to get the jump on today's expanding market

Industrial companies are spending more than $5½ million every twenty minutes for needed goods and services. In spending that much money, they move mighty fast. But *you* have to be even faster to sell to today's dynamic industrial market. Especially if you want to thoroughly cover your customers and prospects among the thousands of industrial companies that are spending this vast sum.

A sound, well-balanced advertising program can help your sales force make an immediate impact on this big market—the market that won't wait to be sold, because it can't wait to buy.

To keep ahead of this expanding market, put hard-hitting industrial advertising on the job. It will give you a greater return on your sales investment.

NATIONAL INDUSTRIAL ADVERTISERS ASSOCIATION, INC.

271 Madison Avenue, New York 16, N. Y.

An organization of over 4000 members engaged in the advertising and marketing of industrial products, with local chapters in ALBANY, BALTIMORE, BOSTON, BUFFALO, CHICAGO, CLEVELAND, COLUMBUS, DALLAS-FORT WORTH, DENVER, DETROIT, HAMILTON, ONT., HARTFORD, HOUSTON, INDIANAPOLIS, LOS ANGELES, MILWAUKEE, MINNEAPOLIS-ST. PAUL, MONTREAL, QUE., NEWARK, NEW YORK, PHILADELPHIA, PITTSBURGH, PORTLAND, ROCHESTER, ROCKFORD, ST. LOUIS, SAN FRANCISCO, TORONTO, ONT., YOUNGSTOWN.

Another **STANLEY STEEL STRAPPLICATION*** on the job

"Uni-Tieing" saves this company $13.40 per truck-load!

Rising packaging and shipping costs prompted this New York manufacturer of metal stampings to stop shipping products loose, in crates or in barrels. Switching to the Stanley "Uni-Tie" Method (making many units into *one*, by securing products together or to skids or pallets with Stanley Steel Strapping) cut costs and reduced loading time per truck by 4 hours! Products "Uni-Tied" in this plant are of almost every imaginable size and shape . . . tubular, conical, concave, rectangular, flat with flanged edges, etc. — evidence that "Uni-Tieing" is extremely adaptable.

Learn how the Stanley "Uni-Tie" Method can save time and money for *you. Without obligation,* call in the Stanley Steel Strapping Specialist. WRITE FOR YOUR FREE COPY of the "Stanley Strapplication Manual of Packaging and Shipping" to STANLEY STEEL STRAPPING, Division of The Stanley Works, Dept. E, 1476 Lake Street, New Britain, Conn.

**The system-atic way to solve specific packaging and shipping problems*

INSURE IT-SECURE IT WITH STANLEY STEEL STRAPPING

AMERICA BUILDS BETTER AND LIVES BETTER WITH STANLEY

STANLEY

This famous trademark distinguishes over 20,000 quality products of The Stanley Works—hand and electric tools • drapery, industrial and builders hardware • door controls • aluminum windows • metal parts • coatings • steel and steel strapping—made in 24 Stanley plants in the United States, Canada, England and Germany

SIR WILLIAM SIEMENS *brought many inventions to the steel industry but none with a greater future than the electric furnace. Knowledge of the carbon arc dated back to 1800. Siemens put it to practical use in 1878, when he built and operated steel-making furnaces on both the direct and indirect arc principles.*

Even then, electric power was too costly, and carbon electrodes of too poor quality, for an electric furnace to operate commercially. It was another 11 years before a successful commercial direct-arc furnace began operating, in France. America's earliest commercial electric furnace (at Holcomb Steel Company, Syracuse, New York) produced its first heat April 5, 1905. It was of 4-tons capacity. Today there are 200-ton electric furnaces and total domestic capacity exceeds 11 million net tons.

Great Names in Steel Making #V

The growth of the steel industry has been so fabulous that it confers ever-increasing greatness on the work of its pioneers. What William Siemens originated, the industry has since developed to an importance beyond anything he ever dreamed.

This is equally true of more recent technological discoveries.

The lubricant Palmoshield, for example, was developed after World War II to replace imported palm oil for rolling tin plate. It was immediately recognized as an important discovery. But, since then, the importance of Palmoshield has been greatly increased by its successful use for the rolling of light and intermediate gauge sheet, and on long terne and coating lines as well.

Most of the rolling mills of North America are today aware that Palmoshield does much more than protect from dangerous dependence on palm oil from overseas. They appreciate that it eliminates the former need for stockpiling and all concern with artificially influenced prices and supply. They value the fact that Palmoshield is produced in the heart of the steel country, from available domestic materials, and under exact chemical control. Fatty acid content can be controlled within ½%.

Moreover, Ironside engineers can and do formulate Palmoshield to suit the mill speed, the method of application and the individual preferences of each user, and guarantee that the compound so developed will not vary in uniformity thereafter.

Ironsides lubrication specialists would like to work similarly with you, to help achieve objectives of increased tonnage, reduced costs, and maximum uniformity of mill production. A letter or phone call will bring you complete information and make available the experience of years of successful cooperation with America's major rolling mills.

Address The Ironsides Company, Columbus 16, Ohio.

By the makers of Palmoshield
"the palm tree that grows in Ohio"

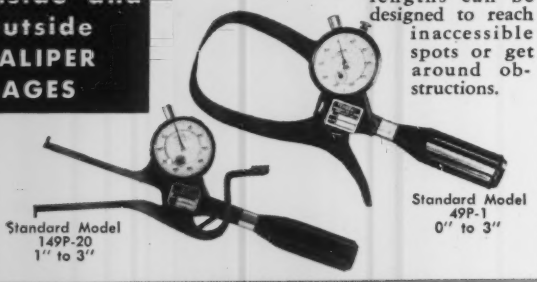
Jos. MARGULIES.

Precision Requires Gages to Suit the Job-

that's why FEDERAL *offers such a variety of Gages!*

Inside and Outside CALIPER GAGES

Specially shaped arms of various lengths can be designed to reach inaccessible spots or get around obstructions.



Standard Model 149P-20 1" to 3"

Standard Model 49P-1 0" to 3"

Just *any* gage is not good enough. Some dimensions require a higher degree of accuracy than others. And some dimensions cannot be reached directly. Still others need ranges or adjustments to give greater gage capacity.

It's easy to check a dimension with a Federal Gage — and it's the quickest and least expensive way. Just call Federal and get the *right* gage for your job.

FEDERAL PRODUCTS CORPORATION
7215 Eddy Street, Providence 1, R. I.

HOLE LOCATION GAGES

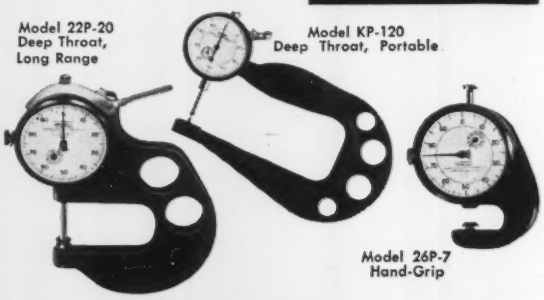
Series 205 Gages accurately check hole location and concentricity. Also adaptable to applications involving hole and surface relationships.

Typical Series 205 Gage (12 Basic Models)

Squareness and location of holes in three mating parts of pump are checked to determine alignment within .0001".

ALL TYPES OF THICKNESS GAGES

Many styles and sizes, for portable and bench use.

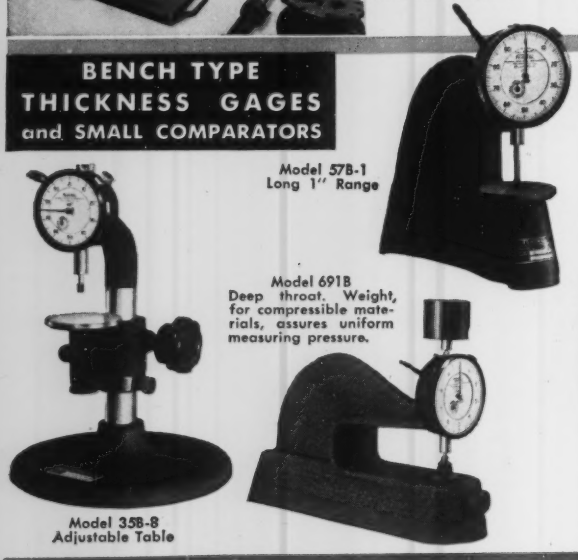


Model 22P-20 Deep Throat, Long Range

Model KP-120 Deep Throat, Portable

Model 26P-7 Hand-Grip

BENCH TYPE THICKNESS GAGES and SMALL COMPARATORS



Model 57B-1 Long 1" Range

Model 691B Deep throat. Weight, for compressible materials, assures uniform measuring pressure.

Model 35B-8 Adjustable Table

OVER 10 TYPES OF COMPARATORS

Model 130B-9 Electronic Comparator, Ball Bearing. Detects one millionth.

Model 136 I.D. — O.D. Electronic Master Comparator Detects one millionth.

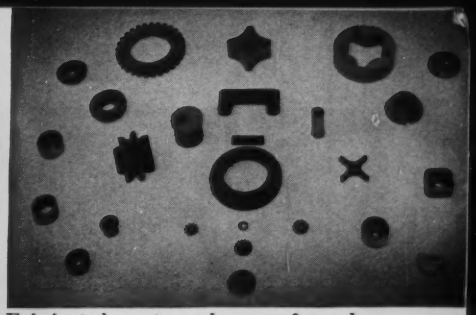
Whatever You Need in Gages . . .

Ask FEDERAL *First*

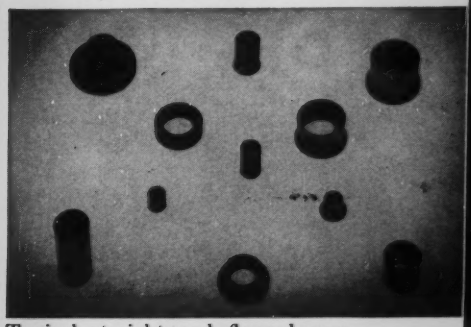
MANY OTHER TYPES

Send for Catalog showing most complete line of Dial Indicator Gages.

GAGES CAN BE SPECIALLY MODIFIED TO SUIT . . .



Fabricated parts and gears formed on Baldwin Compacting Presses.



Typical straight and flanged powdered metal bushings made on Baldwin Compacting Presses.

Other parts being made at United States Graphite on Baldwin presses. The double hub and counterbored parts are test pieces. Others are production items.

New, low-cost compacting presses for powdered metals and ceramics

Baldwin-Lima-Hamilton Corporation announces that its 100 years' experience and know-how in building hydraulic presses has been incorporated in a new, low-cost compacting press—the 30W—specifically designed to serve the powdered metal and ceramics industry.

Its 1-piece frame and floating die deliver the same uniform pressure, the same rigid 4-point guiding, as our regular heavy duty 4-column hydraulic presses. The 30W is designed for versatility—extra motions may be added as requirements become more complex without the need for additional machining.

Rated pressure of the Baldwin Model 30W is 30 tons, with a 20-ton ejection capacity. Stroke is adjustable through its entire fill range of 0 to 4½ in. For complete details, including specifications, write to the Hamilton Division, B-L-H Corporation, Hamilton, Ohio.

Hamilton Division Hamilton, Ohio

BALDWIN · LIMA · HAMILTON

Diesel engines • Mechanical presses • Can making machinery • Machine tools

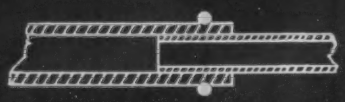
BALDWIN BLH LIMA-HAMILTON

FIRM GRIP NO SLIP

make hose connections faster with

EATON-RELIANCE

HOZ-FAS-NERS®



Production and maintenance men acclaim Eaton-Reliance Hoz-Fas-Ners for speeding up operations, cutting costs. Usable on rubber, plastic or fabric hose, they're always on the job — exerting continuous, uniform pressure at all points.

On assembly line operations, savings in time and motion are substantial with Hoz-Fas-Ners, compared with other type hose clamps. On service . . . removal and replacement of hose is greatly simplified. Hoz-Fas-Ners never need adjustment or retightening — they are vibration-proof and don't work loose.

Hoz-Fas-Ners can be installed quicker than other type clamps . . . no screws to turn, no nuts to put on, no preassembling. Hoz-Fas-Ners are fabricated from the highest quality alloy spring steel, and resist rust — your assurance of long life. Because of the round contours of the sections, the clamps have no sharp edges to cut into hose. They are re-usable — for additional savings.

Write for free Engineering Bulletin No. 1.

ALL STANDARD SIZES AVAILABLE

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RELIANCE DIVISION
MANUFACTURING COMPANY
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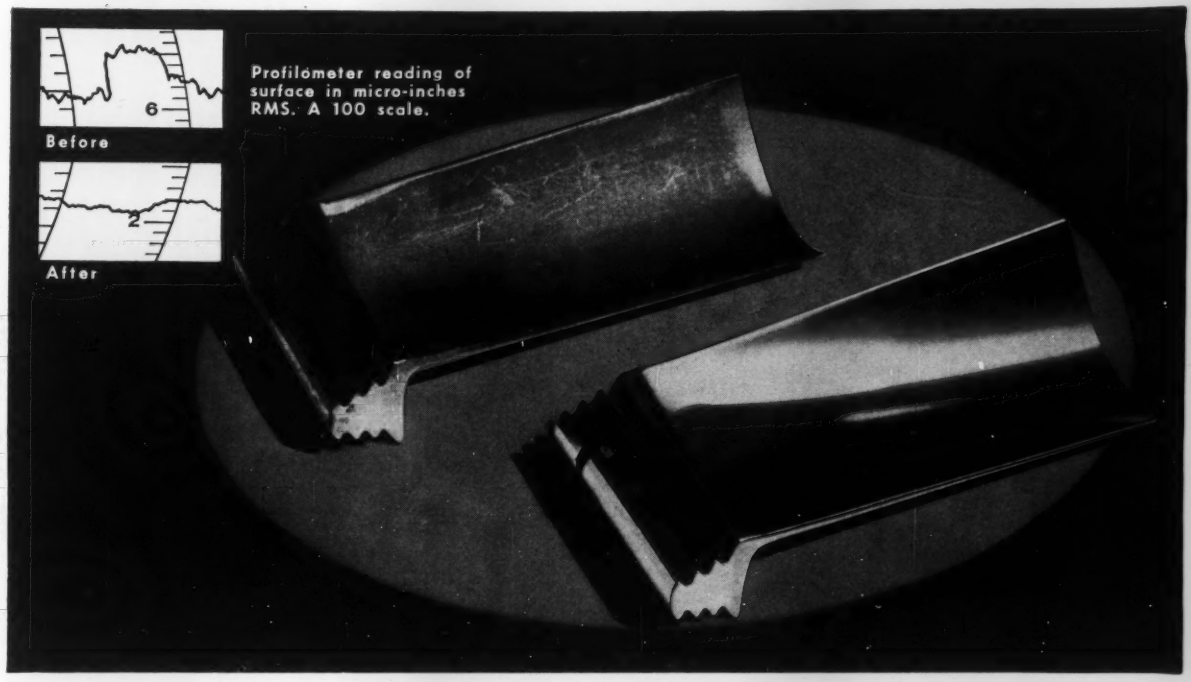
PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers



Cut parts finishing costs, maintain exact tolerances, get absolute uniformity with *Roto-Finish* processes

Roto-Finish, pioneers in precision barrel finishing, offer you a complete finishing service. Savings on deburring, descaling, grinding, polishing, coloring and surface improvement are tremendous. Expensive hand finishing methods can be eliminated.

Roto-Finish processes are controlled to produce the finish you need with no significant dimensional changes. You get absolute uniformity of finish in quantity lots.

Many prominent manufacturers now using Roto-Finish processes are saving money on finishing costs. (Names on request).

ROTO-FINISH CHIPS, COMPOUNDS AND MACHINES ARE OF THE HIGHEST QUALITY

Roto-Finish has never sacrificed quality for the sake of price. Through the years, Roto-Finish has carried on a continuous program of process and product improvement to meet the needs of modern industry. When you choose Roto-Finish processes, you can be sure that you are getting the best in supplies, equipment and complete continuing engineering service.

ROTO-FINISH GUARANTEES RESULTS

There is no costly trial and error involved in the purchase of Roto-Finish equipment. You submit unfinished parts to Roto-Finish along with a finished sample and a description of the finish you require. These sample parts are processed in the Roto-Finish Sample Processing Laboratories, where experienced engineers determine the combination of chips, compounds, and machine required to do the job. Roto-Finish guarantees to reproduce the same results in your plant, using the Roto-Finish processes, that are achieved in sample processing. This service demonstrates for you exactly what you can gain by using Roto-Finish processes.

The sample processing service is available to help you with your finishing problem. Take advantage of this opportunity to save on finishing costs. Send samples of finished and unfinished parts and details of the type of finishing equipment available in your plant.

SEND FOR THIS FREE TECHNICAL DATA FOLDER

It describes the basic process, chips and compounds and the complete Roto-Finish line of standard and special machines.

Roto-Finish COMPANY

3717 Milham Road, Kalamazoo, Mich.

P. O. Box 988

Phone: FI 3-5578

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ENGLAND — Roto - Finish Limited — Mark Road, Hemel Hempstead — Hertfordshire
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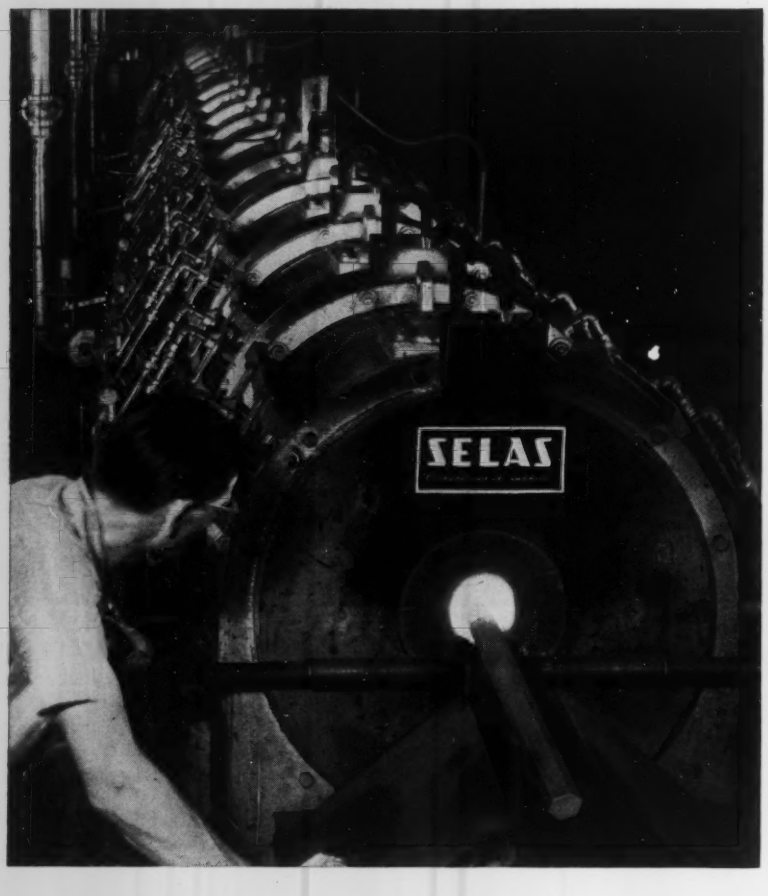
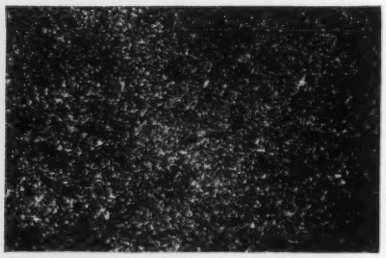
Physical properties improved, uniformity achieved *with* Selas short-cycle hardening and tempering





Photomicrograph (500X) shows structure of an AISI 4140 steel bar, hardened and tempered with Selas short-cycle heating. Yield Strength = 140,000 psi; Tensile Strength = 152,000 psi; Hardness = 32 Rc. Compare this with conventional heating methods, which for 152,000 psi T. S. produce only 115,000 psi Y. S., and to achieve the required 140,000 psi Y. S., it is necessary to go to 180,000 psi T. S., with hardnesses that introduce machining problems.

FOR a given tensile strength or hardness, Selas short-cycle hardening and tempering develops higher yield strength . . . with no sacrifice in ductility . . . in carbon and low alloy steel bars. For with Selas short-cycle heating, a higher tempering temperature can be employed (with no soaking), which enables more complete relief of residual hardening stresses.

Surface decarburization is reported to be negligible, scaling is minimized . . . even though no specially-prepared atmosphere is employed.

Selas fast heating for hardening, quenching and short-cycle tempering of bars is performed continuously, automatically. Consistent metallurgical uniformity is obtained throughout each bar and from bar to bar.

Selas barrel-furnace lines are also widely used throughout the steel industry for hardening, tempering and annealing seamless tubes; heating seamless tubes for sizing; normalizing welded pipe . . . all continuous operations.

The compact, fast heating, gas-fired furnaces save valuable floor space and are adaptable to variations in production-line speeds.

Send for informative articles on Selas tube and bar heating installations. Address Dept. 26.

SELAS
CORPORATION OF AMERICA
DRESHER, PENNSYLVANIA

Heat and Fluid Processing Engineers
DEVELOPMENT • DESIGN • CONSTRUCTION

NO HANDLING PROBLEMS HERE

with Industrial top-running motor driven cranes

This shop has solved its materials handling problem with two *Industrial* 5 ton Top-Running Motor Driven Cranes which provide speedy, flexible movement of parts and materials. Variable speed push-button control facilitates precise crane positioning from the floor.

Whatever the size of your shop, there's an *Industrial* Crane that will help you solve your materials handling problems. You'll find *Industrial* Cranes are *the best cranes for the long run* because they're quality built to reduce maintenance and operating costs. Here are a few *Industrial* features that make them a better value:

- Rolled Forged Steel, heat treated wheels.*
- Long-life, precision ball and roller bearings.
- All-welded, precision jig-bored end trucks for true, smooth operation.
- Two large size gusset plates at each end-truck assure permanent squareness.
- Rugged outrigger for additional lateral strength and support of bridge drive.
- Special push-button control for efficient operation from floor or cab control.
- All *Industrial* cranes designed for easy erection at job site.

*Standard on Heavy Duty models.

Industrial builds a complete line of cranes for every need.
Consult with *Industrial* for assistance in solving your materials handling problems.

Industrial CRANES

TRMDF-257C

INDUSTRIAL CRANE & HOIST
INGERSOLL PRODUCTS DIV. BORG-WARNER CORP.
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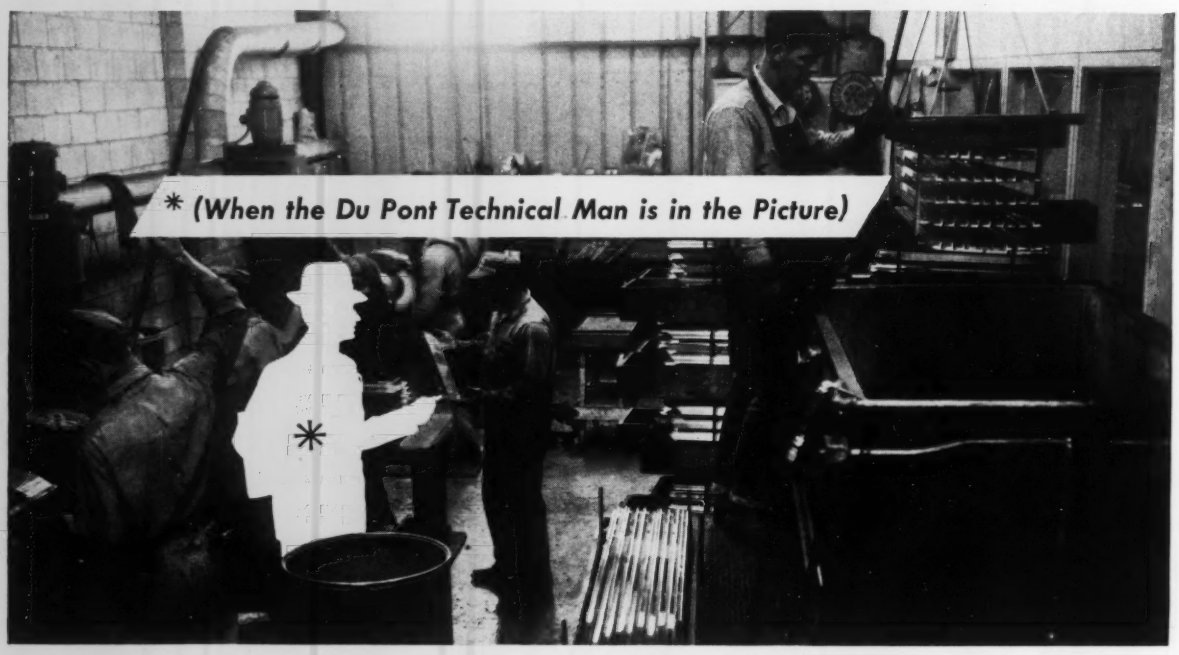
You Get Practical Help on Vapor Degreasing of Metals



Your Du Pont technical man and your distributor for "Triclene" D trichlorethylene are but a phone call away when you need fast, practical help in vapor degreasing.

The broad experience of the Du Pont Technical Representative and the skill and facilities of Du Pont research and laboratories assure you of the finest in technical help. The Du Pont technical man's job is to help you keep your vapor degreasing at top efficiency—whether a complete analysis of your operation is required, or a quick solution to an immediate problem.

Call him direct, or ask your distributor of "Triclene" D for his services. They're yours for the asking. E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Dept., Wilmington 98, Delaware.

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...THROUGH CHEMISTRY

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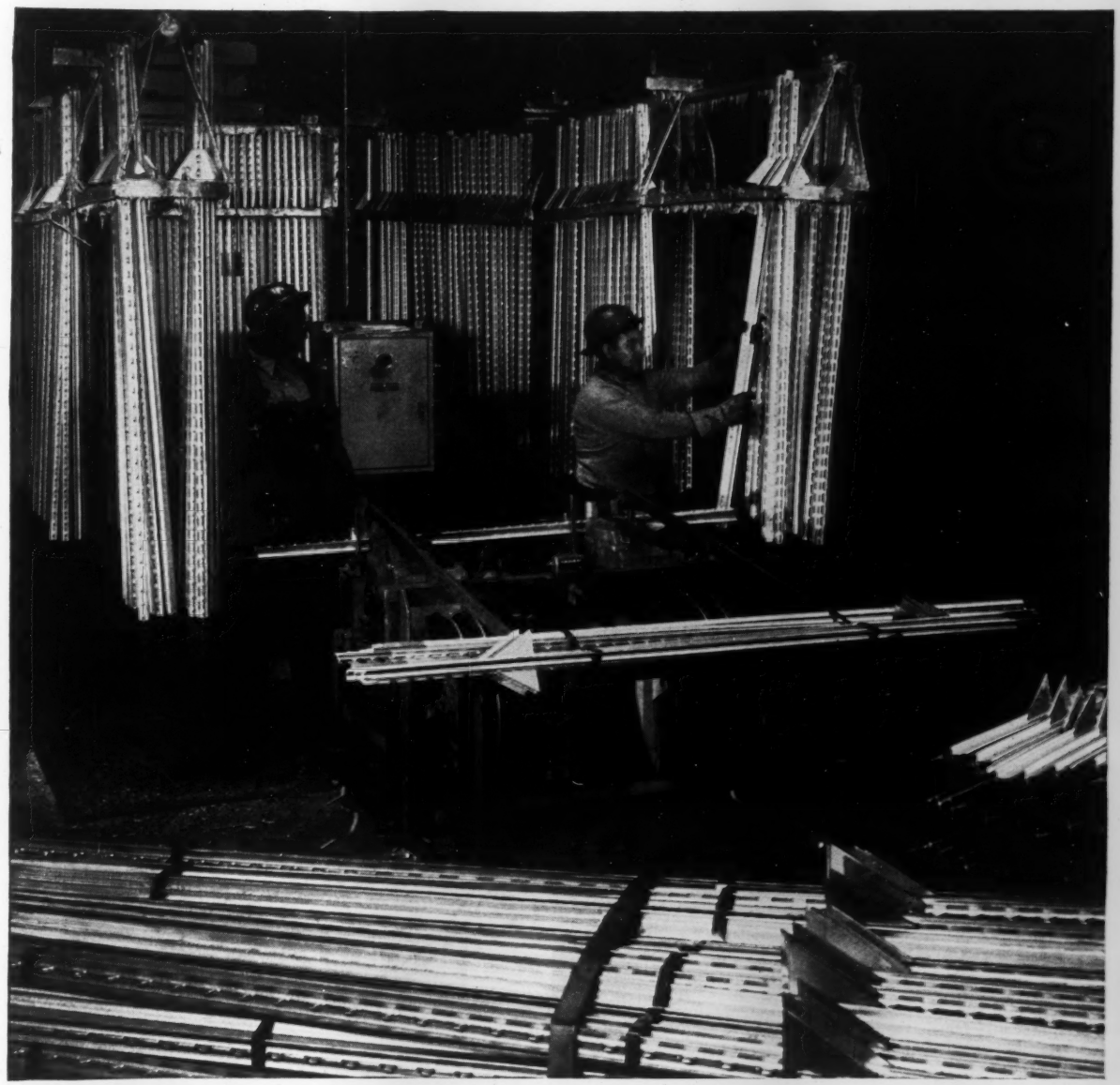
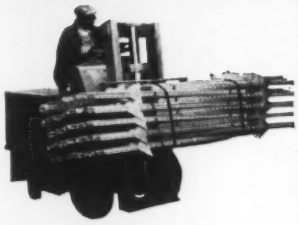




Power does the hustling

These Signode power strapping machines put two straps around a bundle of steel fence posts in four seconds, complete. Then 50 or so small bundles are stacked and hand-strapped to make a big 4000-pound bundle. Over-all strapping time is four times faster than the former tying method. Bundles are tighter, neater—stay tight to destination. Total cost of all the steel strapping in each big bundle is only about a dollar—the whole package material cost! You can't beat the speed, strength and low cost of Signode steel strapping for tying things together. To make your product cost less to handle, store, ship and receive, see your Signode man, or write:

SIGNODE STEEL STRAPPING CO.

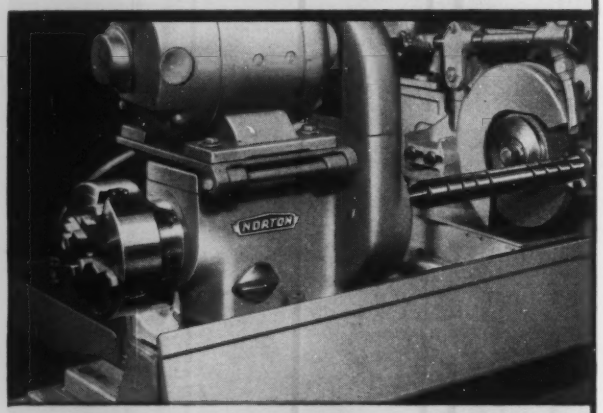
2645 N. Western Avenue, Chicago 47, Illinois

Offices Coast to Coast. Foreign Subsidiaries and Distributors World-Wide

In Canada: Canadian Steel Strapping Co., Ltd., Montreal • Toronto

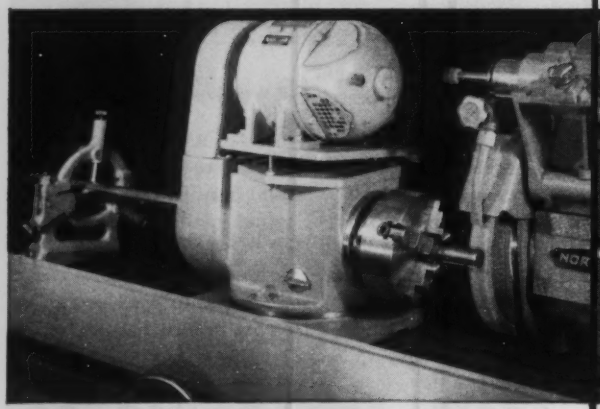
Norton builds extra versatility into universal grinders...

JOB-SPEEDING FEATURES

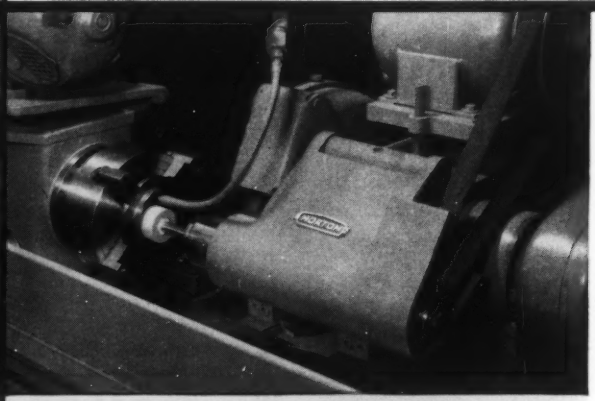


Minimum effort to change from dead center to chucking work. Chuck may remain mounted at back end of headstock while dead-center grinding.

to put extra dollars in your pocket

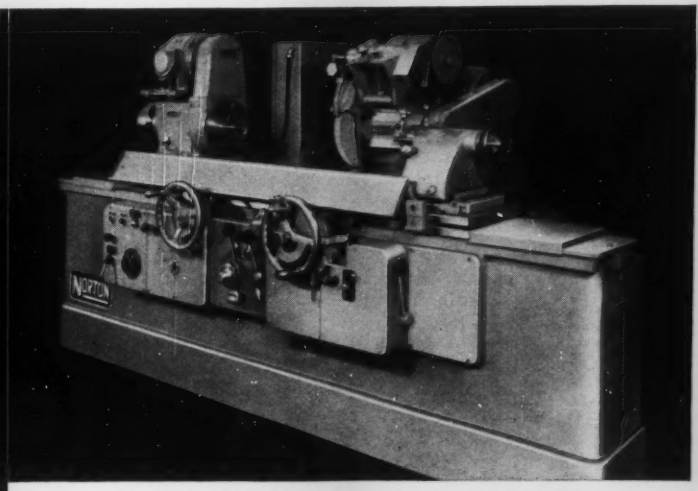


Hollow headstock spindle gives you additional capacity for grinding long bars by passing them clear through and supporting them in grinding position.



Hinged-bracket type internal grinding spindle swings up and out of the way when not in use. This means quicker setups for your I.D. or O.D. grinding.

Norton 10″ universal grinder. Made with 20″ or 24″ nominal lengths between centers. Catalog 170.



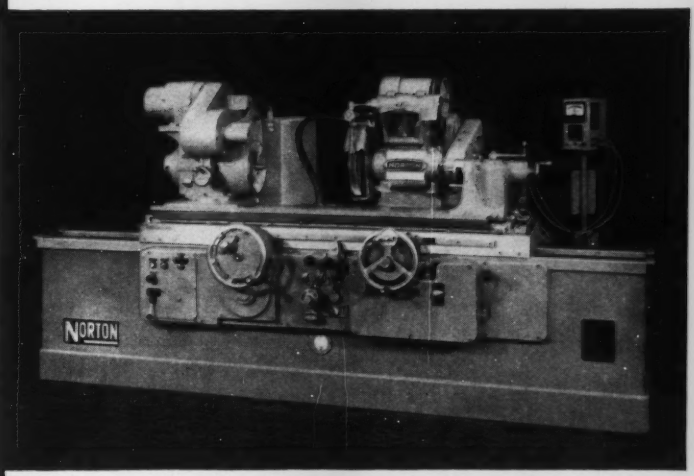
Norton 12″ Type U-4 universal grinder. Made with 36″ or 48″ nominal lengths between centers. Catalog 231.

Many a user rates his Norton universal grinder as a practically "complete grinding department." Why? Because Norton builds extra versatility into its universals for faster external, internal, face, taper and angular wheelside grinding, including many special jobs. Also they're built with many famous job-speeding, cost-cutting features: For example:

Extremely rapid chucking . . . quick change-over to live or dead spindle operation . . . easy work speed changes . . . independent wheel settings that do difficult jobs fast . . . extra capacities on wheel head and headstock . . . precise swivel table alignment with the SWIVALIGN *Dual Electric Indicator, an optional extra.*

Made In The Size You Need

Norton universal grinders are made in 10″, 12″, 14″ and 18″ swing capacities. That means you can get exactly the size to bring you many time-and-money-saving "Touch of Gold" advantages. For complete facts on these high-efficiency machines see your Norton representative or write us direct. And remember: Only Norton offers you such long experience in both grinding machines and grinding wheels to help you produce more at lower cost. NORTON COMPANY, Machine Division, Worcester 6, Massachusetts.



Norton 14″ Type U-4 universal grinder. Made with 36″, 48″ or 72″ nominal lengths between centers and also in 18″ swing capacity. SWIVALIGN* Dual Electric Indicator, at right of picture, measures swivel table adjustments and is optional on all Norton universal grinders. Catalog 819.

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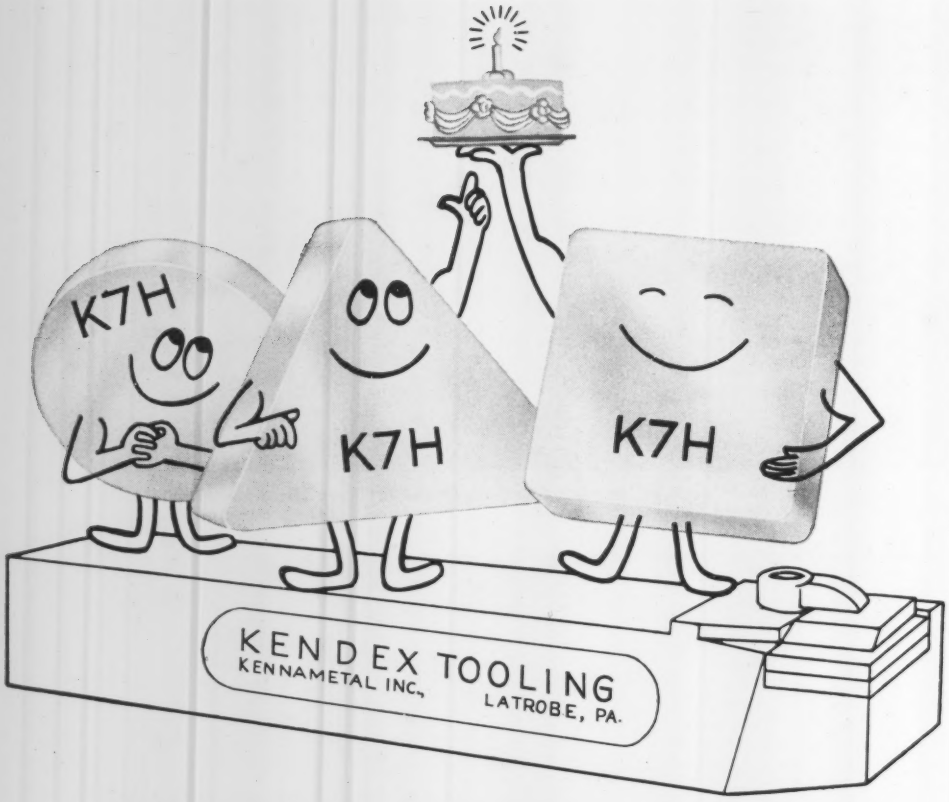


KENNAMETAL* K7H

only a year old but already a champ

After only a year, Kennametal Grade K7H is the proven leader in high velocity machining and in cutting heat-treated and high tensile steels. Its high hardness (93.5 Rockwell A) combined with exceptional strength (three times that of the non-metallics) provides outstanding wear resistance and maximum resistance to cratering . . . high resistance to shock . . . fast cutting and excellent finish.

K7H "throw-away" inserts used with Kendex tooling are improving production and reducing tooling costs over a wide range of applications. Here are a few typical performances:

Production *increased 50%* by substituting K7H on an SAE 8620 forging with a finish cut .060″ deep, 900 sfm, and .018″ feed. K7H machined the same number of pieces per cutting edge as did a competitive carbide at a much slower speed.

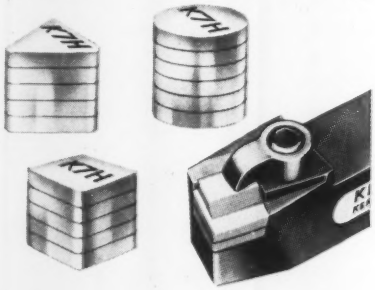
K7H cuts *252 pieces as compared to 30* . . . the best record for a competitive carbide in facing cut to dead center of SAE 1018 steel 5″ O.D. gear blank, at 1000 sfm (at outer edge) and .008″ depth of cut.

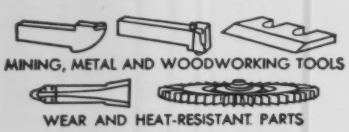
In a carbide evaluation test, the lineal footage cut by K7H was *five times* the best footage machined by any of three competitive grades tested . . . and with less than .005″ wear land. Material used: Halcomb 218 steel, 48 Rockwell C, .030″ depth at .010″ feed.

K7H *maintained excellent surface finish* . . . less than 10 microinch finish in cutting 4340 steel at 1000 sfm; 30 to 60 microinch finish in cutting 1095 steel at 1500 sfm.

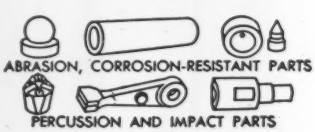
Try K7H on your hard-to-machine materials and high velocity jobs. A Kennametal tool engineer can help you take advantage of this exceptionally strong Kennametal grade. Discuss your machining problems with him. Or write KENNAMETAL INC., Latrobe, Pennsylvania.

*Trademark C-3033





INDUSTRY AND
KENNAMETAL
...Partners in Progress



Soft, absorbent, 2-ply Scott Wipers* are chemically treated for wet strength, and Perf-embossed.® This specially processed surface makes Scott Wipers ideal for a job like this—cleaning up a lathe —and for wiping stock, tools, instruments, hands and face. *PATENT PENDING

WIPER PROBLEM? Look what Crown Cork & Seal did with Scott Wipers!

The Can Plant of Crown Cork & Seal Co., Inc., Philadelphia, makes cans for food, beer, oil, shaving and whipped cream products. Three years ago, Scott Wipers were introduced to replace baled waste rags. Today, Scott Wipers are used in *every* manufacturing department in this plant.

Women production workers like the *softness* of Scott Wipers, in wiping black tin coating off their hands. All employees using them prefer the convenience of having Scott Wipers right at the work station. Scott Wipers, fresh from a box, carry no clinging foreign particles to cut and scratch . . . a real safety feature.

Management has also found that Scott Wipers are cheaper to store, cheaper to handle than cloth wipers. By using Scott Wipers, this plant saves 20% annually in material costs. Like more details? Call your local Scott distributor, or write Scott Paper Company, Department S-75, Chester, Pennsylvania.

SCOTT PAPER COMPANY

Makers of the famous Scott paper products you use in your home.
Consult your local TV schedules for Scott's program, "Father Knows Best."

For fast, cold sandwich bonding ...3M Adhesive EC-1357

NIP ROLLER OR COLD PRESS COMPLETES STRONG, LIGHTWEIGHT SANDWICH PANELS WITH EC-1357. YOU NEED NO HEATED PRESSES.

Gain the speed and economy of cold bonding! Fabricate sandwich panels for non-load bearing uses with 3M Adhesive EC-1357.

This high-strength, flexible adhesive bonds sandwich panels without clamps or heated presses. You force-dry the solvent out of the adhesive before bonding. Cold press or nip roller finishes the job. You get maximum immediate strength. And EC-1357 builds up even more strength with age as it cures at room temperatures.

Because it is dark in color, EC-1357 absorbs drying heat fast. Thus it cuts production time, allows continuous movement from adhesive spraying to finished panel. EC-1357 resists moisture and normal temperatures, too. For load-bearing panels, investigate 3M Adhesive EC-1177.

SEE WHAT 3M ADHESIVES CAN DO FOR YOU!

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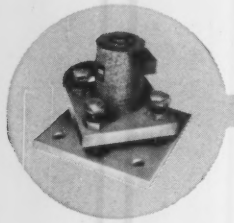
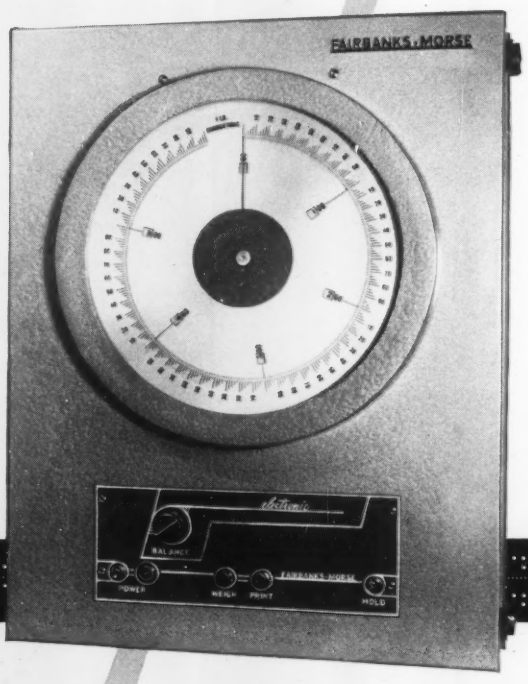
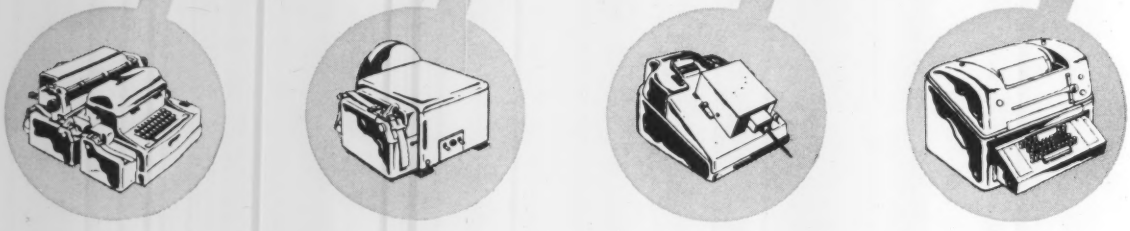
Weigh in the language of accounting machinery







Now it is possible for your scales to "talk" directly to your business machines like automatic typewriters, automatic adders or motorized tape punches. Fairbanks-Morse electronic scales can do this and save you many time-consuming and costly intermediate operations—each with the opportunity for human error.

The weight message from the electronic load cell is translated to the language of business machines by the Fairbanks-Morse Model CDO Readout Instrument. The CDO will convert from decimal to the five channel, seven channel, eight channel or coded decimal codes—whichever system you are using. Send for the new CDO bulletin No. ED-16 today. It will suggest many applications for automatic and remote weighing. Fairbanks, Morse & Co., Dept. S-5-20, 600 South Michigan Ave., Chicago 5, Illinois.

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SCALES • PUMPS • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • RAIL CARS • HOME WATER SERVICE EQUIPMENT • MOWERS • MAGNETOS

This Month's

GEAR PIX

Announcing

A NEW HIGH-SPEED TANDEM

GEAR HOBBER

a new concept . . .

. . . supplies the answers to gear production problems. It's Michigan Tool's newest, the Tandem High-Speed gear hobber, Model 1433. A machine that can be set up in tandem or in-line series to tailor gear output to needs. The 1433 will precision hob spur gears up to 12 pitch or helical gears up to 30° helix. Center distance between hob arbor and work spindle is 3½ inches. Maximum crossfeed stroke is 4 inches.

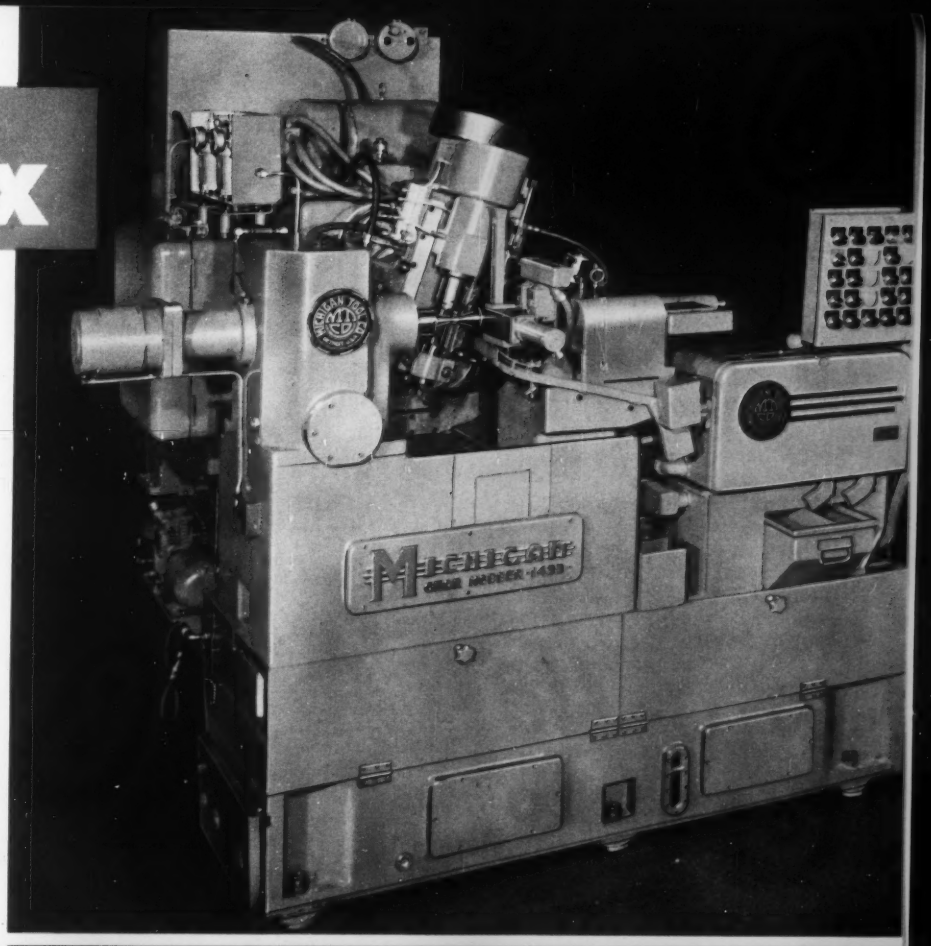
. . . a new dimension

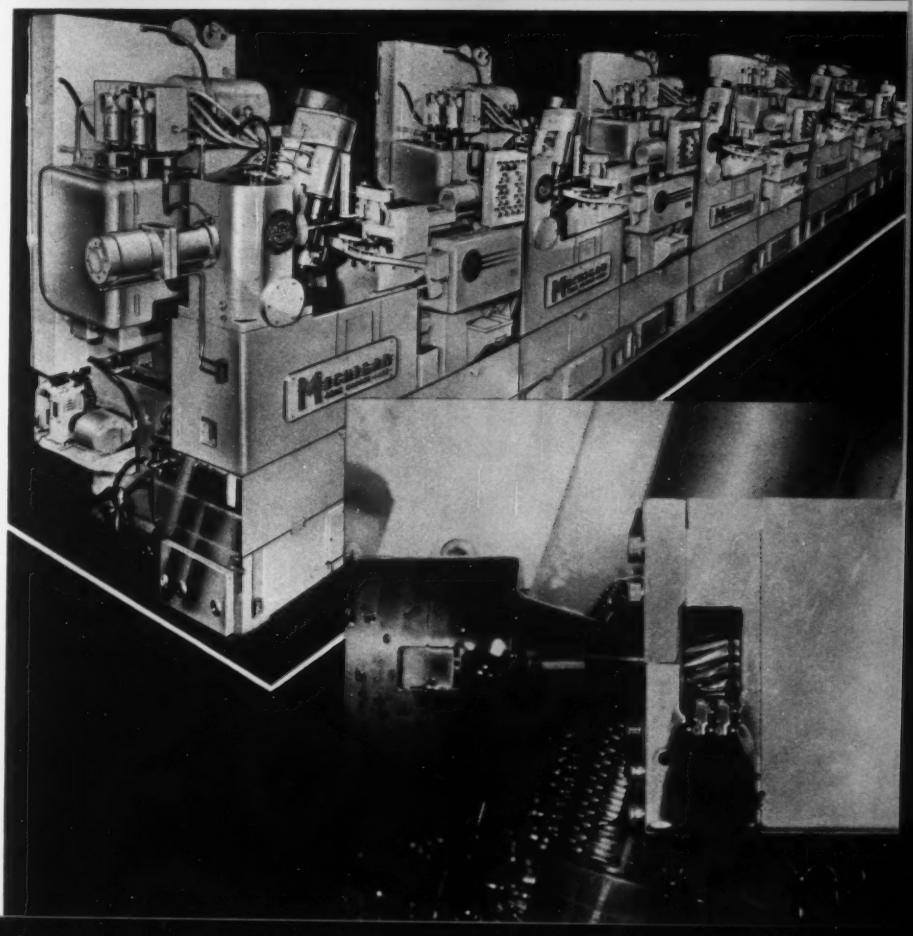
This new hobber lends itself to any degree of automation. Blanks may be supplied from an overhead distribution system. A common sub-base—in any length or configuration—provides parts removal from any number of machines. All machine services including the master panel and electrical connections are self-contained as part of the basic "building-block." Sub-bases are readily joined side by side to any length for any production rate.

. . . a proven principle

The 1433 single-spindle hobber features "plunge" or standard cutter feed, vernier-scale helix angle setting and an automatic expansion arbor for workholding. Set up is fast and simple. Hob speeds range up to 500 rpm—hob feed is infinitely variable. Automatic size control is also provided. Cut gears, automatically unloaded, are air-blast cleaned and automatically checked.

For complete information on Michigan's Tandem gear hobber, write for Bulletin TH-33.





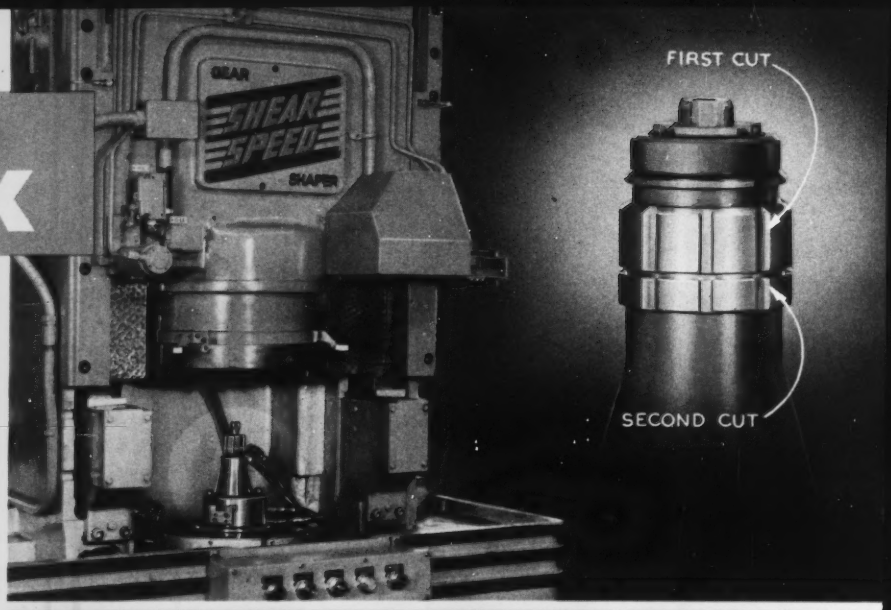
MICHIGAN TOOL COMPANY

7171 E. McNICHOLS RD. • DETROIT 12, MICH.
IN CANADA: COLONIAL TOOL CO., LTD.

This Month's

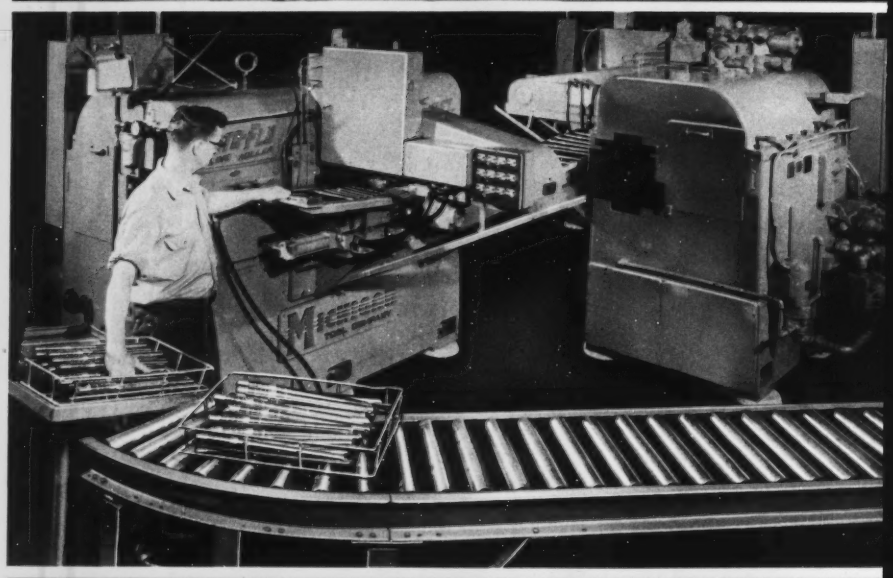
GEAR PIX

CUTS TWO PD's IN ONE SETUP WITH SAME TOOLS ▶



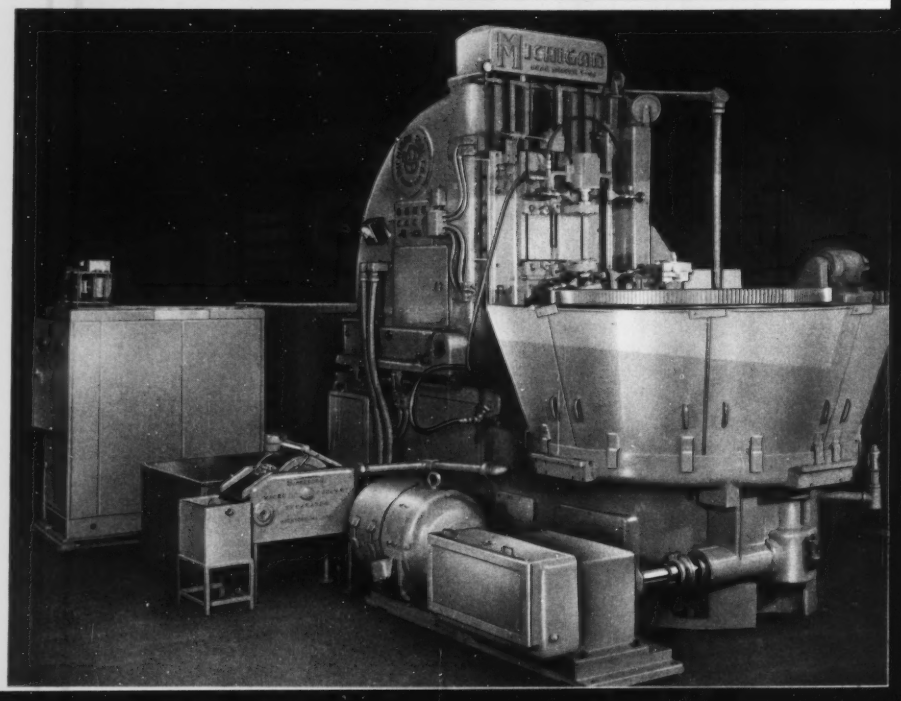
A new two-stage Shear-Speed gear shaper does the job if you have a part (such as a two-step clutch) requiring two different pitch diameters. It eliminates second setups. The two sets of teeth are cut in sequence (the deeper teeth first) with the machine cutting head locked in two different positions. Differential tool feed takes care of the PD's. Work cycle is automatic. All Shear-Speeds in the 1800 series can be so modified. We'll be glad to fill you in on details.

285 SHAFTS PER HR TRI-SPLINED BY "CHIPLESS MACHINING" ▶



Three different involute splines are cold formed on a transmission shaft in this trio of Michigan Roto-Flo machines. Transfer devices make the setup fully automatic after the first station. The method also offers long tool life and added product strength. More information is available in our Bulletin RF-55. Write for it.

HIGHER PERFORMANCE WITH IMPROVED GEAR SHAVER ▶



An improved Michigan Gear Shaver, Model V-48, cuts spur, spiral or herringbone gears up to 4 ft. P.D. It features full-range drive using only two sets of change gears and an integrated spiral pitch checker. Speeds and feeds are completely variable. Literature available soon.

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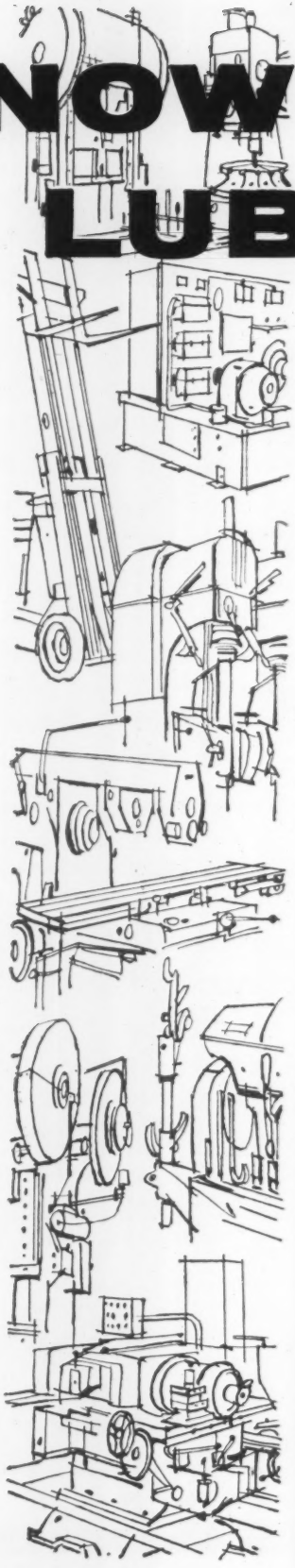
NOW! ATLANTIC LUBRICANT 54



...the one lubricant for practically every industrial need

New Atlantic Lubricant 54 is industry's closest approach to the universal grease lubricant. The use of this distinctively purple grease in your plant practically assures the correct choice in any application. It has given outstanding performance in all types of machinery.

Every shop, large or small, can make economical use of Atlantic Lubricant 54 because it gives

- ... multiplicity of use—reduces chance for error, cost of warehousing, and handling
- ... outstanding rust protection—protects ferrous surfaces under wet conditions
- ... excellent lubrication performance from very low to extremely high temperatures
- ... unusual stability against oxidation and softening under rugged working conditions
- ... positive identification due to its purple color

This product is available from warehouses conveniently located throughout Atlantic's marketing territory and may be ordered through the nearest office listed below.

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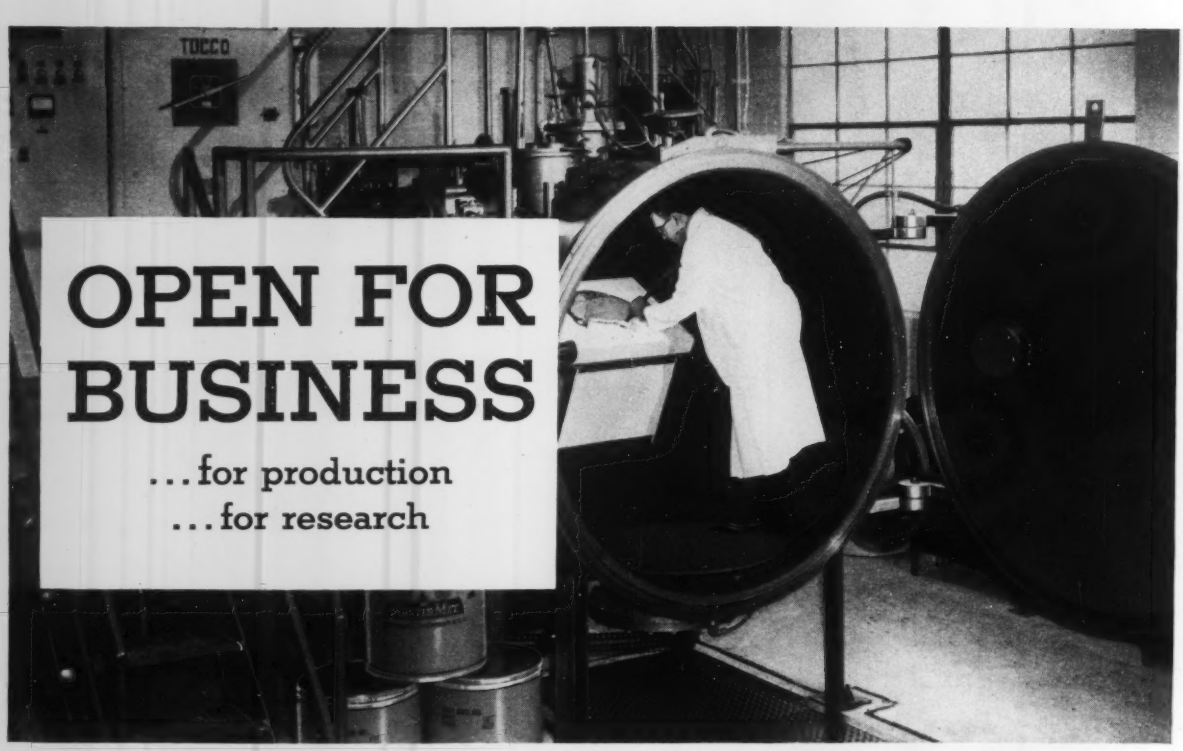

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...for research

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Cannon-Muskegon offers complete vacuum-melting facilities for ferrous, nickel- and cobalt-base alloys

NOW AVAILABLE: stainless, tool and die, magnetic steels—high-temperature, corrosion-resistant, low expansion alloys — bearing steels, and alloys for electrical and electronic applications plus special steels.

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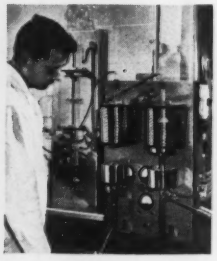
Ingots, billets and a variety of cast forms — for rolling, forging, extruding or machining.

X-Ray fluorescence spectrometer—the most modern means for rapid and accurate analysis of major elements in alloys — just one of a series of regular evaluations that maintain highest quality control standards.



Precise carbon analysis is another UltraMet test for chemical quality. Additionally, tensile properties, creep tests, Rockwell hardness, bent wire and other tests safeguard perfection throughout production.

MasterMet alloys are produced by air-melting in modern high-frequency furnaces. The chemical analysis of each melt is certified to your specifications — exactly produced to compensate for melting losses.

For full particulars, write for our new bulletin on Vacuum Melting and Air Melting facilities and alloys . . . plus details on new "tight" specs on Armco 17-4PH.

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ULTRAMET VACUUM-MELTED ALLOYS FOR INDUSTRY

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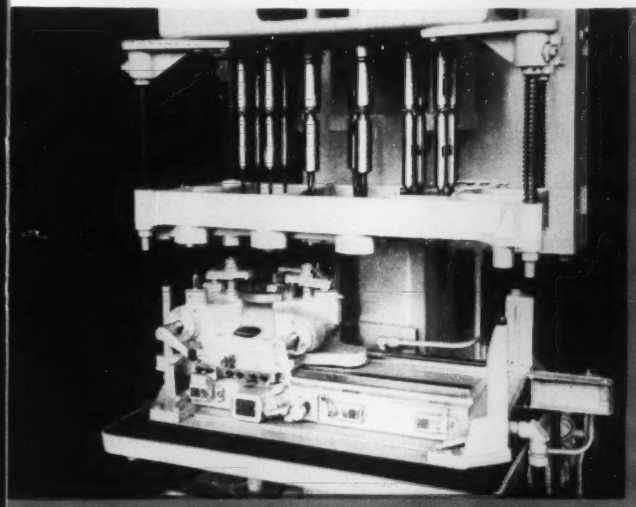
METALLURGICAL SPECIALISTS

Natco Naturals

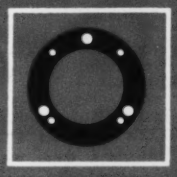
Cost-Cutting Ways
You Can Use
Standard Multi-Spindle Natcos

Any time your parts require machining *more than one hole*–drill, bore, face or tap–it may well be a "Natco Natural." Your standard Natco will produce substantial savings in a surprising number of situations, *even in small job-shop lots!* Call in your nearby Natco field engineer; he'll tell you in short order whether you've got a "Natco Natural" there.

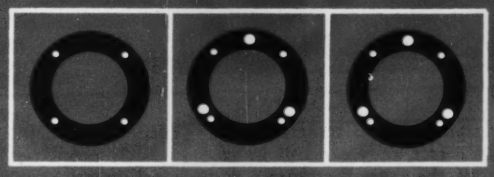


Multiple Drilling Operations on One Part-Face

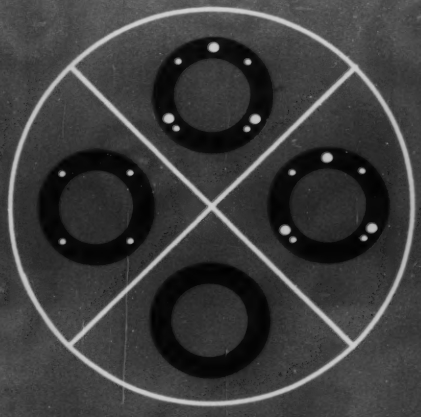
Straight-line indexing *on a Natco H6 produces 49 parts per hour. 4 holes drilled in first position, 3 holes drilled in second position, 4 holes c'bored in third position. One part completed every three strokes. Automatic cycling frees operator for other work. Illustrations below show three other ways of handling this part.*



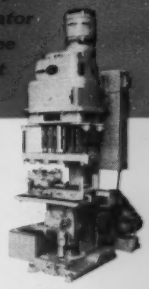
45 parts per hour. *Inexpensive box jig. Operator positions jig under appropriate spindles. One complete part for 3 strokes of machine.*



75 parts per hour. *3-position fixture. Operator shifts parts after each stroke. One part completed every stroke.*



135 parts per hour. *Rotary 4-position index table. Operator unloads and loads while three operations proceed. One part completed every stroke.*



Standard multi-spindle Natcos *range from 1 hp, 10-spindle machines to 25 hp machines with up to 72 spindles. Spindles in standard Natcos are driven through universal joints and located by either adjustable arms or bored slip plates.*

NATCO

National Automatic Tool Company, Inc.

Richmond, Indiana

Multi-spindle drilling, boring, facing & tapping machines. Special machines for automatic production.

Call Natco Offices in Chicago, Detroit, New York, Buffalo, Boston, Philadelphia, Cleveland, Los Angeles; distributors in other cities.

Rolling up the Miles

Rolling Down the Costs

Ask any user: stainless steel trailers *do* roll up extra miles. In fact, they can roll indefinitely because of their great strength and resistance to rust and wear . . . qualities in which *no other metal* matches stainless steel. Of course, that longer operational life means lower over-all expense.

But stainless helps roll down the costs (and UP the profits!) in other ways. It's so strong that thin-wall sections and structural members can be used, permitting greater payload capacity and offering additional savings in operating expenses. Painting isn't needed, and maintenance is cut to a whisper.

Such properties make stainless steel an ideal material for trailers, trains, planes, etc. They qualify it for myriad other applications, too. Chances are that *you* could use it when your product (or process equipment) requires superior strength, corrosion resistance, heat resistance, sanitary qualities, ease of fabrication, durability and attractiveness. ● We'd be pleased to discuss it with you—anytime you say or anywhere you'd like to meet. ***Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa.***

Write for your copy of "STAINLESS STEEL IN PRODUCT DESIGN"

40 pages of useful engineering and fabricating data, including practical examples showing where, when and how stainless steel improves design, adds benefits, helps sales.

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AL Stainless Steel

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FEATURE	Lodge & Shipley 10" HI-TURN	Lathe B	Lathe C
HEADSTOCK			
Full 5 horsepower	yes		
200 to 3000 r.p.m.	yes		
All spur gear drive	yes		
Swing over bed	13¼"		
Spindle speeds	9		
BED			
Width of bed	11⅜"		
Depth of bed	11⅝6"		
Hardened, ground, replaceable bedways	yes		
QUICK CHANGE GEAR BOX			
Number of quick change feeds	9		
Range of Feeds, thous. per rev.	1.5 to 24		
CARRIAGE			
Carriage length	19⅛"		
Carriage bridge width	5⅞"		
Cross slide travel	6¾"		
Flame-hardened and ground cross slide ways	yes		
TAILSTOCK			
Tailstock spindle diameter	2⅛"		
Tailstock spindle travel	4½"		
MISCELLANEOUS			
Size of lathe tool	¾" x ¾"		
Net weight, base machine	3400 lbs.		
Template type length stops	yes		

Your Lodge-ical Choice for low-cost high-production

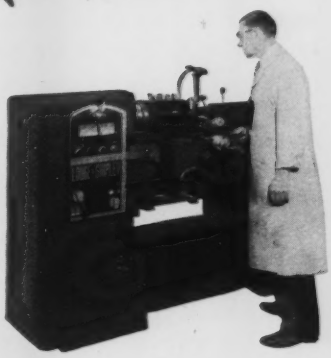
Lodge & Shipley

Lodge & Shipley 10" HI-TURN Production Lathe does job of really big lathe

...and completely outperforms any other 10" lathe!

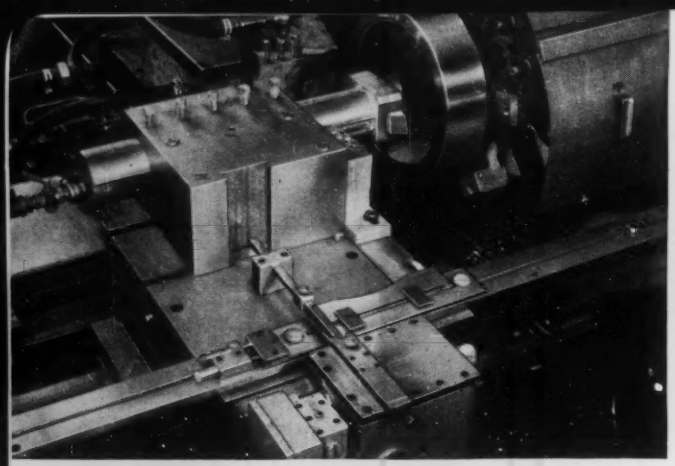
BIG in power and production . . . BIG in speed, in rugged construction and accuracy, the Lodge & Shipley 10" HI-TURN Production Lathe costs only ½ the price of a good 13" lathe used for comparable work. Here are a few of the many features that put the 10" HI-TURN in the big lathe, big value class and put it 'way ahead of *any* 10" lathe:

You make the comparison *with any 10" lathe*



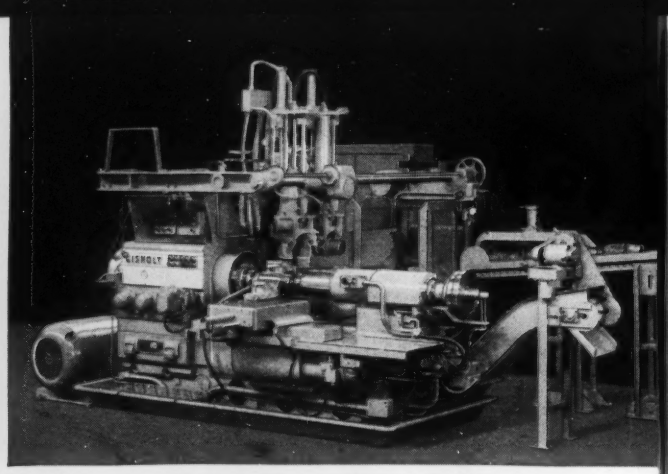
Compare the Lodge & Shipley 10" HI-TURN Production Lathe with *any other* 10" lathe . . . even with 13" lathes. If you don't need additional thread chasing facilities, it's the lathe for you!

Get complete details now. Write: The Lodge & Shipley Co., 3055 Colerain Ave., Cincinnati 25, Ohio.



NO. 24—WITH CHUCK

Ninety pounds of tough bearing steel are removed in two 8-minute operations on this job. One No. 24 handles six types and 24 different sizes of inner and outer bearing races with ease and efficiency. A JETracer on the rear independent slide simplifies spherical, straight and taper boring operations—also improves accuracy and finish and lowers unit costs.



NO. 24—ON TAILSTOCK-SUPPORTED EXPANDING ARBOR

Automatic loading and unloading are part of the machining cycle on this setup. Utilizing overhead clamps and a traversing carriage arrangement, the No. 24 makes fast work of these tough steel tool joint forgings. The operator has separate push-button control over all machine and handling functions for faster, easier setups and change-overs.

YOU CAN REDUCE COSTS ON

NEW GISHOLT MASTERLINE NO. 24

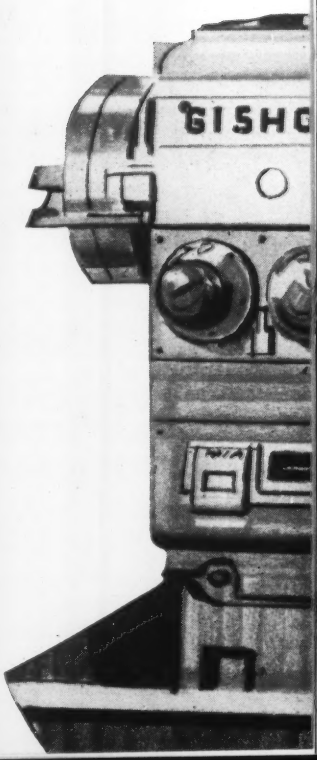
WHETHER YOUR LARGE PART PRODUCTION INVOLVES long, steady runs or small repeat lots, you'll find definite ways to cut costs with this new Gisholt MASTERLINE No. 24 Automatic Production Lathe.

And you can realize these savings whether your work has to be held on an arbor, in a chuck or special fixture, or between-centers with work driver and tailstock—for the big No. 24 will handle parts all four ways.

Cost cutting with this extra powerful (up to 125 h.p.) single-spindle automatic is inherent within its standard automatic cycle. Hydraulic control of all carriage and auxiliary slide movements—plus automatic stopping and starting of the spindle—lets one operator handle two or more of these machines, or perform other jobs during machining time.

Still more savings are realized through faster, easier setup and shorter change-over periods. During setup, all hydraulic actuated movements may be manually controlled. Spindle speeds, feeds and stops are easily changed. This means you can produce a variety of large parts—or handle small repeats—without excessive down time between sizes or jobs.

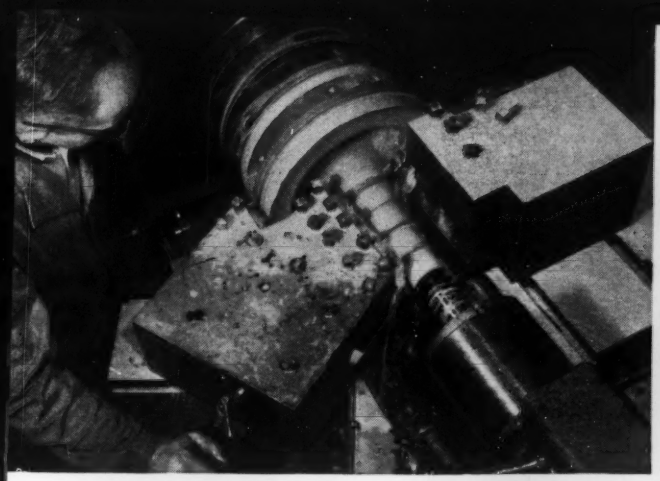
Whatever type of large part you are producing now—or planning for the future—your Gisholt Representative can show you how and where the No. 24 will produce it for less cost. Call him today—or write Gisholt for complete information.

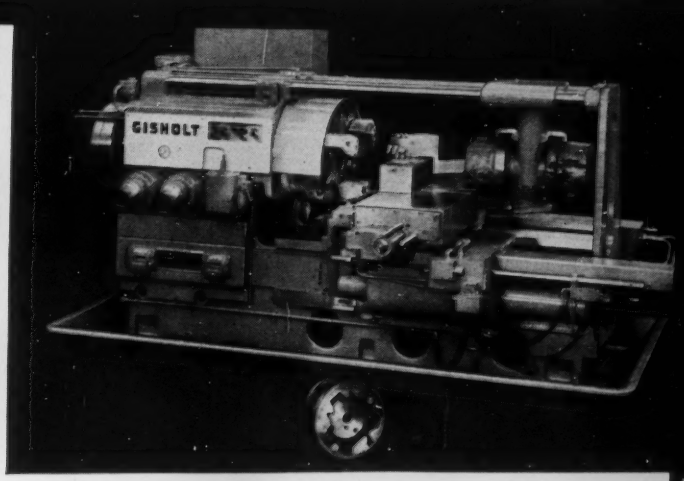


GISHOLT MACHINE COMPANY

Madison 10, Wisconsin, U.S.A.

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • PACKAGING MACHINES • MOLDED FIBERGLAS PLASTICS





NO. 24—WITH CHUCK AND TAILSTOCK SUPPORT

With this setup, husky airplane drive gear and propeller shafts are completed in two fast operations on two No. 24's. One man handles both machines. The first operation is shown. Five diameters are machined plus turning, facing and chamfering. The second operation, on the other end, is similar. Floor-to-floor time: 12 min. per operation with 75 lb. of metal removed.

NO. 24—WITH CHUCK AND LOADING ARBOR

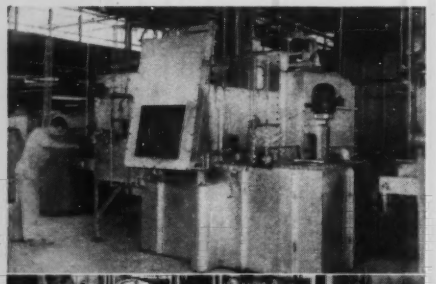
Here, standard tooling plus a unique, indexing-loading arbor arrangement on the No. 24 has cut costs and reduced effort in the machining of heavy cast iron diesel cylinder heads. Floor-to-floor time is only 1.2 minutes. More time is spent making chips because most of the loading-unloading operation is performed while the tools are working on the next part.

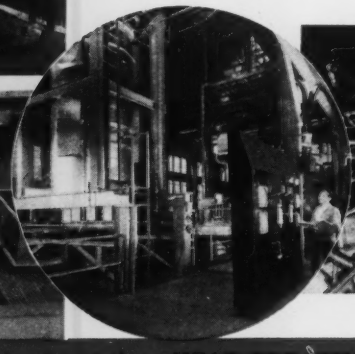
LARGE PART PRODUCTION WITH THE

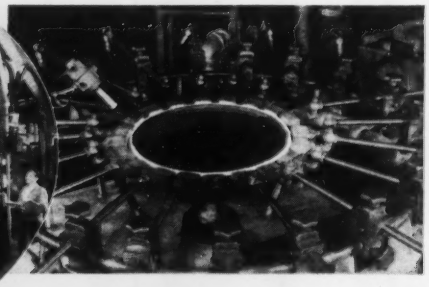
AUTOMATIC PRODUCTION LATHE

WHEN IT COMES TO HEAT TREATING—
"Do-It-Yourself" can sometimes be costly

Buying equipment and supplies to perform heat treating operations within your own plant is only one step in many that must be considered when contemplating the installation or expansion of a heat treating department.







Here are some of the factors that should be included when figuring the cost of operating your own heat treating department—of "doing-it-yourself" when it comes to heat treating:

- **Technical skill:** Trained operators whose skill is the result of years of experience are essential
- **Maintenance:** Rapid deterioration of equipment occurs unless there is constant repair, maintenance, and skillful handling of the equipment
- **Quality control:** Testing equipment and skilled operators are necessary to maintain uniformity and quality control of all heat treating operations
- **Sufficient equipment and supplies:** A great variety of equipment is needed to meet the requirements of annealing, brazing, hardening, carburizing, stress relieving, nitriding, and all other heat treating processes; and an endless variety of materials and supplies must be kept on hand.

These problems and many more have been solved by commercial heat treaters. They have the answers because heat treating is their business.

Every MTI commercial heat treater listed here is a specialist with complete service facilities under one roof. Each one has the facilities, equipment, skill and experience which will enable him to meet your most exacting heat treating requirements.

Consult any of these HEAT TREATING SPECIALISTS

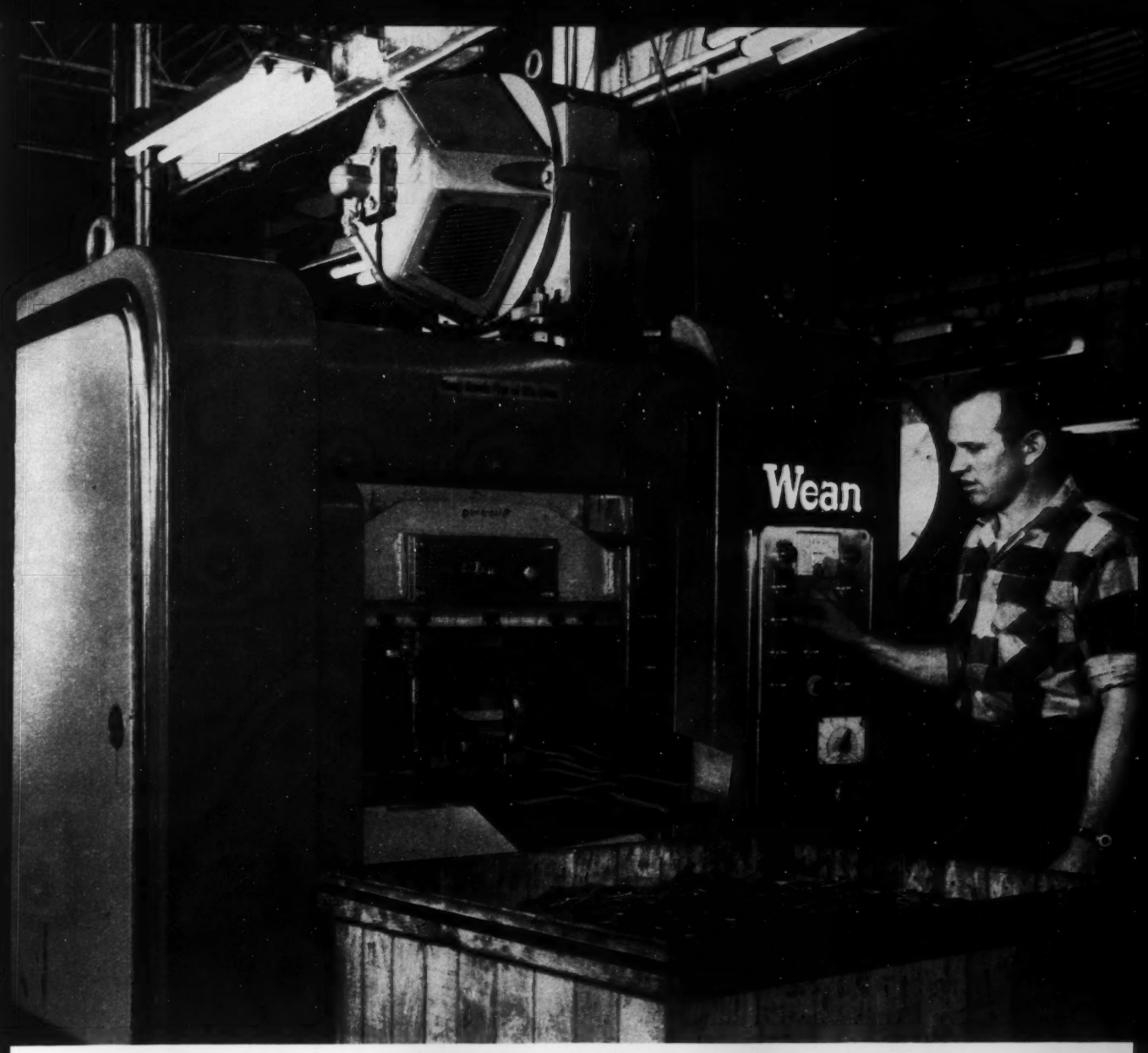
American Metal Treatment Co.
Elizabeth, New Jersey
Anderson Steel Treating Co.
Detroit, Michigan
B. & W. Precision Heat Treating Co.
Kitchener, Ontario, Canada
Benedict-Miller, Inc.
Lyndhurst, New Jersey
Bennett Heat Treating Co., Inc.
Newark 3, New Jersey
Commercial Metal Treating, Inc.
Bridgeport, Conn.
Cook Heat Treating Co. of Texas
Houston 11, Texas
The Dayton Forging & Heat Treating Co.
Dayton 3, Ohio
Dominy Heat Treating Corp.
Dallas, Texas
Drever Company
Philadelphia 33, Pennsylvania
Greenman Steel Treating Company
Worcester 5, Massachusetts

MTI MASTER CRAFTSMEN METAL TREATING INSTITUTE

Fred Heinzelman & Sons
New York 12, New York
Alfred Heller Heat Treating Co.
New York 38, New York
Hollywood Heat Treating Co.
Los Angeles 38, California
L-R Heat Treating Company
Newark, New Jersey
The Lakeside Steel Improvement Co.
Cleveland 14, Ohio
Metallurgical, Inc.
Minneapolis 14, Minnesota
Metallurgical, Inc.
Kansas City 8, Missouri
Metlab Company
Philadelphia 18, Pennsylvania

New England Metallurgical Corp.
South Boston 27, Massachusetts
Paulo Products Company
St. Louis 10, Missouri
Pittsburgh Commercial Heat Treating Co.
Pittsburgh 1, Pennsylvania
Pittsburgh Metal Processing Co., Inc.
Pittsburgh, Pennsylvania
The Queen City Steel Treating Co.
Cincinnati 25, Ohio
J. W. Rex Company
Lansdale, Pennsylvania
Stanley P. Rockwell Company
Hartford 12, Connecticut
Scott & Son, Inc.
Rock Island, Illinois
Standard Steel Treating Co.
Detroit 10, Michgan
Syracuse Heat Treating Corp.
Syracuse, New York
Winton Heat Treating Company
Cleveland 16, Ohio

This advertisement sponsored by these Companies which are members of the Metal Treating Institute



Is the Wean "Flying Press"

the fastest press in the world?

WE THINK IT IS. While our top speeds have stayed around 600 strokes per minute on the "flying press," the size of piece is not restricted to washers and the like which are made on other high speed presses.

For example, where conventional presses rarely can process more than 100 feet of metal per minute, the "flying press" has performed at speeds in excess of 300 feet per minute.

One new model, for instance, blanks automotive assemblies 8 feet long at 45 per minute.

Yet, the "flying press" has other major advantages for you. Despite its revolutionary construction, it requires up to 20% less maintenance than other presses — it has no brake or clutch to wear. And, because of almost perfect dynamic balance, the press can be floor mounted.

We could write a book about the features of the Wean "flying press" — in fact we have. It's soon to be released . . . and it's yours for the asking. Write to the address below. We will mail your copy of the Wean "Flying Press" brochure as soon as it comes from the printers.

Wean Equipment Corporation

CLEVELAND 17, OHIO

Self-aligning

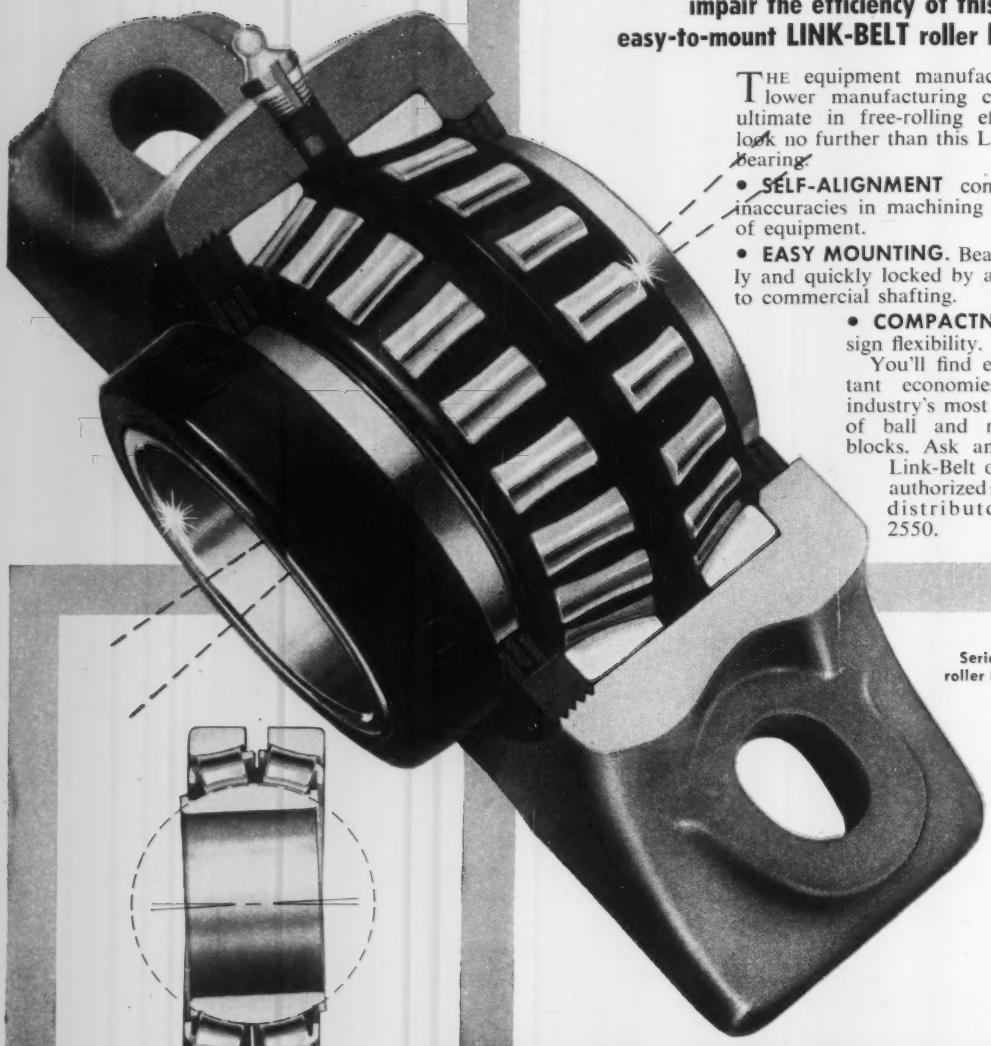
FOR LONGER LIFE

Not even misaligned shafts or supports impair the efficiency of this easy-to-mount LINK-BELT roller bearing

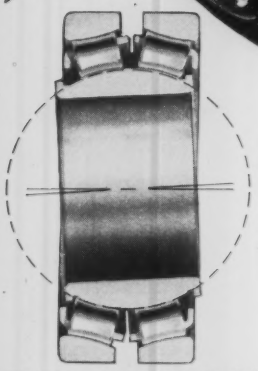
THE equipment manufacturer seeking lower manufacturing costs plus the ultimate in free-rolling efficiency need look no further than this Link-Belt roller bearing.

- **SELF-ALIGNMENT** compensates for inaccuracies in machining and assembly of equipment.
- **EASY MOUNTING.** Bearing is securely and quickly locked by a heavy collar to commercial shafting.
- **COMPACTNESS** offers design flexibility.

You'll find equally important economies throughout industry's most complete line of ball and roller bearing blocks. Ask any one of 40 Link-Belt offices or your authorized stock-carrying distributor for Book 2550.



Series 400 roller bearings



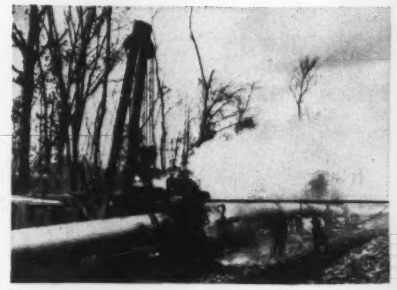
FREE ROLLING—SELF ALIGNING. Spherical inner ring aligns freely in any direction. Load is distributed over entire roller, assuring full capacity. Destructive edge loading cannot occur.

LINK LB BELT

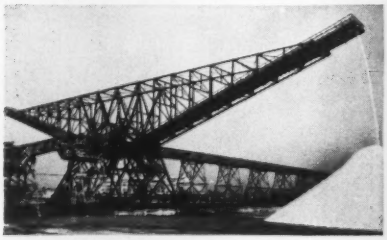
self-aligning ball and roller bearings

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World. 14,440

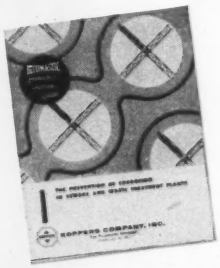
(Advertisement)



American Louisiana Pipeline, carrying natural gas 1000 miles from Louisiana to Michigan, was given the proven protection of coal-tar enamel coatings. Three different types of enamels were used on various sections: Bitumastic® No. 2 Enamel for application in mild climates, Bitumastic No. 70-B Enamel for application to portions subjected to colder weather, and Bitumastic Hi-Melt Enamel for hot sections of the line after compressor stations. There's a Bitumastic Enamel for every pipeline need, from hot-line coating to sub-zero conditions. Your Koppers representative will be glad to explain why coal-tar enamel is your best investment for long-lasting protection of pipelines.



19 Years of Protection were given this giant gantry crane at a salt-producing plant by a coating system of Bitumastic Super Service Black. Exposed to the corrosive combination of salt plus atmospheric moisture, the coating system has required only minor touch-up in all these years of service. Bitumastic Super Service Black is one of seven Bitumastic coatings; the complete line offers wide flexibility in the selection of corrosion-preventive materials to best meet the individual requirements of your application.



Corrosion Control in sewage and waste treatment plants is the subject of a new bulletin now available from Koppers. It contains complete engineering specifications for protective coating systems. Please request your copy on company letterhead from Koppers Company, Inc., Tar Products Division, 1455 Koppers Building, Dept. 101E, Pittsburgh 19, Pa.

how to
CUT CORROSION LOSSES
a report by Koppers Company, Inc.

Number 8 of a series

F. R. Charlton
Development Group Supervisor

An ideal coating possesses the ability to adhere tenaciously to a metal surface directly. Coal-tar enamels will provide such a bond when the surface is preheated. However, enamels applied directly to metal surfaces at normal temperatures chill too quickly and a poor bond results.

* * *

To overcome this problem, enamel primers of modified coal-tar pitch in suitable solvents were developed. When hot enamel is applied over a thoroughly dry, solvent-free pitch film, the primer melts slightly and produces a welded system—primer to pipe and enamel to primer.

The drying time of enamel primers is directly related to the volatility of the solvent and the environment. If hot enamel is applied to the primer before it is completely dry, the traces of solvent will destroy the bond to the enamel. Conventional practice is to prime one day and enamel the next, although this waiting period may be extended to several days or longer by poor drying conditions.

* * *

The Coatings Group at our Verona Development Laboratory recently studied this problem from a fresh point of view. They searched for a new base material, other than coal-tar pitch, which (1) would be compatible with the enamels, (2) would permit employing more volatile solvents, and (3) would provide a superior bond. After thorough study, a number of new formulations were tested. One met the requirements; it is called Bitumastic® Jet-Set.

Bitumastic Jet-Set is an entirely new kind of primer. It is formulated from special, plasticized resins which permit the use of low-boiling solvents and are compatible with coal-tar enamel. Bitumastic Jet-Set exhibits remarkably low temperature susceptibility and excellent resistance to chemical environments and moisture.

The drying rate of Bitumastic Jet-Set is truly amazing. It dries to touch in from 1 to 15 minutes and is ready for enameling in a maximum of 8 hours; conventional primers under similar conditions require several days to dry adequately.

* * *

Bitumastic Jet-Set opens up entirely new opportunities for the application of coal-tar enamel. Field experience has proved that the fast-drying characteristic of this new primer saves time and actually permits work to continue where heretofore, conventional primers have necessitated shutdown. Another application, where piling was driven after being enameled, demonstrated the excellent bonding ability of Bitumastic Jet-Set.

Complete data on this new primer is available. Ask your local Koppers representative, or write Koppers Company, Inc., 1450 Koppers Building, Department 101E, Pittsburgh 19, Pa. District Offices: Boston, Chicago, Los Angeles, New York, Pittsburgh, and Woodward, Ala. In Canada: Koppers Products, Ltd., Toronto, Ont., and Edmonton, Alta.

KOPPERS

BITUMASTIC
REG. U. S. PAT. OFF.
COATINGS AND ENAMELS

Introducing Handy
ALUMIBRAZE
A NEW METHOD FOR JOINING ALUMINUM
HANDY ALUMIBRAZE is a powdered aluminum-silicon alloy and flux mixture for use in salt bath brazing. It can be used to join complex aluminum assemblies and has been tested and plant-proved for two years.

Typical Alloys Being Brazed With ALUMIBRAZE

Old Designation	New Designation
2S	1100
3S	3002
52S	5052
54S	5154
61S	6061
62S	6062
63S	6063
66S	6066
A612 Casting	
Pioneer 40E Casting	
X2219 Casting	

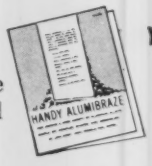
HANDY ALUMIBRAZE is manufactured by Handy & Harman under license from The Glenn L. Martin Company. Patent applied for.

ADVANTAGES: Cost savings are immediate through the reduction of complex jigs and fixtures. Placement of the alloy is rapid, simple and sure. Alloy is preplaced in exact amount required, precisely where needed. It stays put during the brazing cycle. Even heating minimizes the possibility of warpage. And the soundness of HANDY ALUMIBRAZED joints, their strength and their corrosion resistance are equal to or better than joints made with conventional forms of filler metal.

HOW IT WORKS: Mixed with water to form a slurry, HANDY ALUMIBRAZE is applied adjacent to the joints required to fill the joints and make fillets. Assembly is then baked at 1000°F to remove moisture. This leaves the brazing alloy powder firmly cemented to the aluminum surface, the flux serving as the cement. Assembly is then dipped in molten brazing salt. The flux cement itself has a higher melting point than either the brazing alloy or the brazing salt, but it is soluble in the molten salt bath. Thus, the brazing alloy is held in place even while melting until the cement has been dissolved by the molten salt. As the flux cement is dissolved away from the molten filler metal, the alloy runs into the joint capillary spaces and also forms a generous, smooth fillet. Send for Bulletin 23. It gives full details on this modern, cost-cutting development.

BULLETIN 23

gives you the complete Alumibraze Story. Send for your copy today.



Your NO. 1 Source of Supply and Authority on Brazing Alloys

HANDY & HARMAN

General Offices: 82 Fulton St., New York 38, N. Y.

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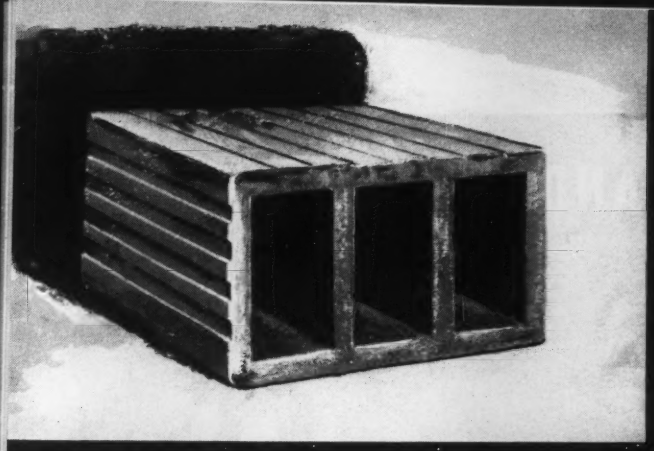


No Margin for Air– No Margin for Error

ANOTHER DRIVE REQUIREMENT MEETS ITS MASTER

Yes, it's a fact—unless you remove the air from the clay, you get a no-good tile. And whether air is your problem, or not—error is always a problem. And it's never a mistake to come to Master for the right power drive. In every kind of industry, Master customized package drives give you the utmost in flexibility, compactness and performance.

Here, the primary requirement is power—and the husky, big 200 H.P. Master fills the bill year in and year out. Your requirements might be better met by integrating Master components into a single, efficient, compact unit for the right horsepower, right shaft speed and right mounting features. What are they?

A husky 200 H.P., 440 volt squirrel cage induction Master Motor powers this 14-ton De-Airing Brick and Tile Machine with a capacity of over 8000 bricks per hour. Two parallel shafts carrying pug knives work clay, pass it into vacuum chamber with auger cylinders where it is finished and discharged.

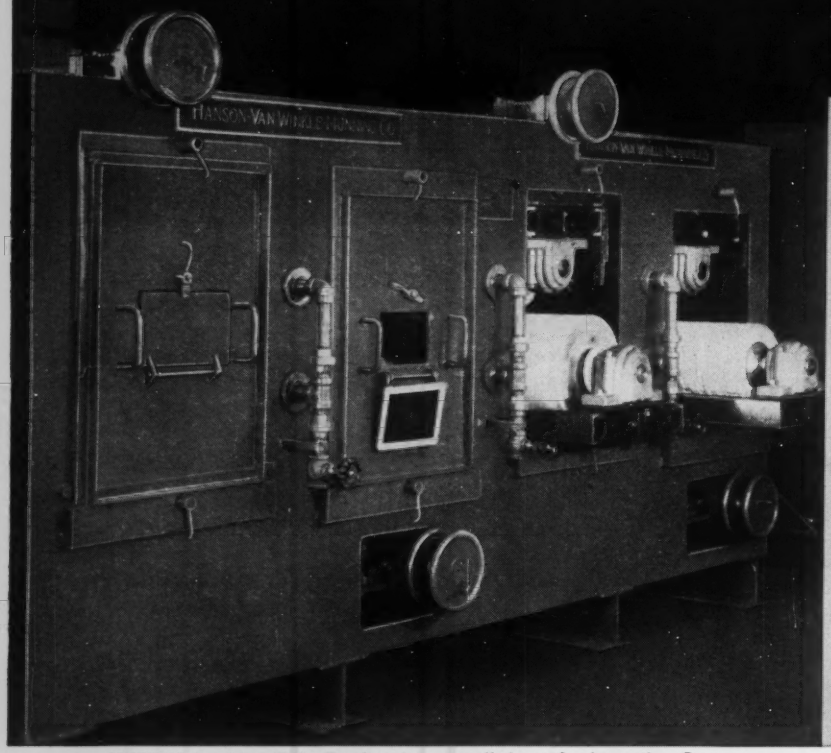
Motor Ratings	¼ to 400 H.P. All phases, voltages and frequencies.
Motor Types	Squirrel cage, slip ring, synchronous, repulsion-start induction, capacitor, direct current.
Construction	Open, enclosed, splash-proof, fan-cooled, explosion-proof, special purpose.
Speeds	Single-speed, multi-speed, and variable speed.
Installation	Horizontal and vertical, with or without flanges and other features.
Power Drive Features	Electric brakes (3 types)—5 types of gear reduction up to 432 to 1 ratio. Mechanical and electronic variable speed units—fluid drives—every type of mounting.

MASTER

THE MASTER ELECTRIC COMPANY

DAYTON 1, OHIO

CONTINUOUS STRIP AND SHEET METAL PROCESSORS



cut cleaning time to a fraction with this automatic H-VW-M SCRUBBER UNIT

H-VW-M Scrubber Unit. Brush units are pulled out for inspection. In a matter of minutes they could be replaced, if necessary with new brushes.

...and no down time either! Brushes are replaced easily while unit is in operation!

H-VW-M Scrubber Units—which adapt to fit into any system—are equipped with an exclusive, patented device that permits replacement of brushes *while the unit is running.* Just turn a few bolts, slide worn brush out, and insert replacement. Not a moment's production time is lost!

Add the advantages of this remarkable new feature to the enormous savings you'll realize in cleaning, reworking and inspection time, and you'll see why the rugged, efficient H-VW-M Scrubber Unit has no equal. 3149

Get more facts about H-VW-M Scrubbers, with their exclusive easy-brush-replacement feature, by writing today for Bulletin HB-100.

Hanson-Van Winkle-Munning Co., Matawan, New Jersey. Offices in principal cities.

H-VW-M

Hanson-Van Winkle-Munning Company, Matawan, New Jersey. Offices in principal cities.

PLATEMANSHIP —Your H-VW-M combination—of the most modern testing and development laboratory—of over 80 years experience in every phase of plating and polishing—of a complete equipment, process and supply line for every need.

STRAIGHT FACTS ABOUT HOLO-KROME SOCKET SCREWS

30 seconds to separate fact from fancy!

FACT 1 Holo-Krome Socket Screws are far tougher than you might think. Their sockets easily withstand at least 50% more torque than can be exerted by a hex key in ordinary hand-tightening.

FACT 2 Power tool tightening is different. Then tightening force depends on the torque of the driving tool, strength of the bit, and the inherent toughness of the socket. H-K sockets are guaranteed to give unfailing performance.

FACT 3 Holo-Krome sockets have sharp hex corners, untapered socket walls, socket depth scientifically proportioned, continuous metal fibers reinforcing the socket wall.

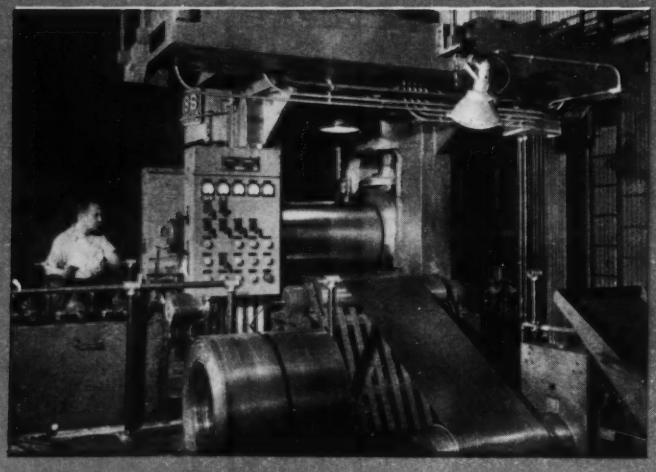
Your best insurance against socket screw failure is H-K's exclusive forging method. For the toughest in socket screws—and hex keys—look to Holo-Krome!

HOLO-KROME

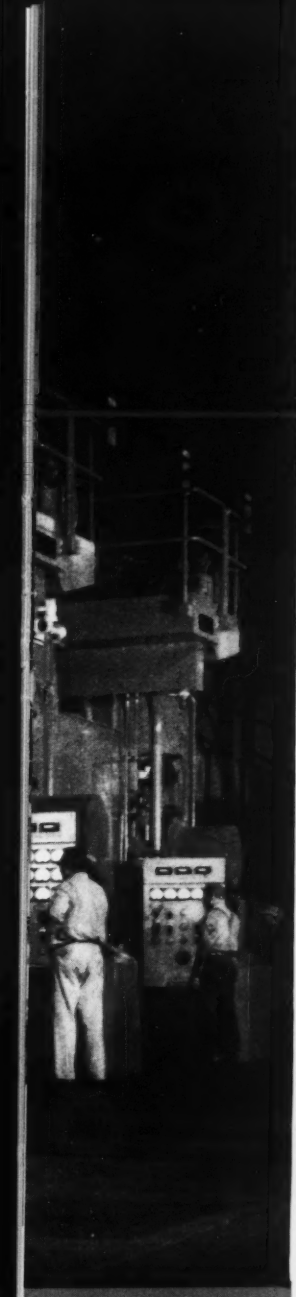
THE HOLO-KROME SCREW CORP., HARTFORD 10, CONN.

Sold only through authorized Holo-Krome distributors.

New Bliss 4-stand tandem mill at Empire Steel. Each stand is a 19" and 51" by 52" four-high mill. All entry and delivery equipment, including tension reel, coil buggy and belt wrapper were also made and installed by Bliss. Many of the rolls were supplied by Bliss' Mackintosh-Hemphill Division.



New Bliss 2-high 30" x 50" temper mill processes much of the output from the tandem. Its rated speed and coil capacity are the same as the big mill's.



Why Empire Steel picked BLISS mills for its new cold roll department...

Already known as a producer of hot rolled sheet and plate, Empire Steel Company, Mansfield, Ohio, has just completed a new cold roll department that ranks as one of the most up-to-the-minute in the country.

The key installation is a new Bliss four-stand tandem mill. Its 1866-feet-per-minute delivery speed on wide strip provides ample capacity for all Empire's foreseeable needs. A new Bliss single-stand two-high temper mill completes Empire's cold rolling facilities. Both mills are equipped with Bliss entry and delivery equipment capable of handling coils weighing up to 34,000 pounds.

Empire's selection of Bliss equipment was a logical one. Four years ago, Bliss engineered a complete hot strip mill for Empire, including the rebuilding of some existing equipment and the addition of completely new mills and accessories. The success of this modernization program had a strong influence on the company's decision to come to Bliss for its new cold rolling department.

Whether you need a complete new mill or advice about modification to your existing facilities, it will pay you to discuss your problem with a Bliss engineer. To get acquainted, why not write for a free copy of our 60-page Rolling Mill Brochure, Bulletin 40-A.

BLISS
SINCE 1857

is more than a name . . . it's a guarantee

E. W. BLISS Company, General Office: Canton, Ohio
ROLLING MILL DIVISION: SALEM, OHIO

Plants at Canton, Cleveland, Salem and Toledo, Ohio; Detroit and Hastings, Michigan; Midland and Pittsburgh, Pennsylvania; San Jose, California. Representatives throughout the United States.

for steel or non-ferrous metals

Now... 6 SPECIAL TITANIUM ALLOYS

Whatever your low-carbon titanium requirement, there's an ELECTROMET titanium alloy to suit your melting practice. ELECTROMET produces three standard grades of low-carbon ferrotitanium, each grade containing a maximum of 0.10 per cent carbon.

Of special interest to producers of high-quality forgings are the low aluminum and silicon contents of this alloy, which make ELECTROMET ferrotitanium specially suited for the production of forgings having good mechanical properties.

Silicon-titanium is available for adding titanium to either non-ferrous alloys or steels where the simultaneous addition of silicon is desired. Manganese-nickel-titanium is available for adding titanium to nickel-base high-temperature alloys. Aluminum-titanium is a special alloy for the titanium metal industry.

For additional information about ELECTROMET titanium alloys, please contact the nearest ELECTROMET office listed below.

ELECTRO METALLURGICAL COMPANY
A Division of
Union Carbide and Carbon Corporation
30 E. 42nd Street UCC New York 17, N. Y.

Offices: Birmingham • Chicago • Cleveland
Detroit • Houston • Los Angeles
Phillipsburg, N. J. • Pittsburgh • San Francisco
In Canada: Electro Metallurgical Company,
Division of Union Carbide Canada Limited,
Welland, Ontario

Electromet
Trade-mark
FERRO-ALLOYS AND METALS

ELECTROMET LOW-CARBON FERROTITANIUM

ELEMENT	30% Titanium Grade	50% Titanium Grade	70% Titanium Grade
Titanium	27-32%	50-55%	68-72%
Aluminum	0.15% max.	0.15% max.	0.15% max.
Silicon	0.10% max.	0.10% max.	0.10% max.
Carbon	0.10% max.	0.10% max.	0.10% max.
Size	2 in. x Down	2 in. x Down	2 in. x Down

OTHER TITANIUM ALLOYS

Silicon-Titanium

Titanium	40-50%
Silicon	45-50%
Iron	3.00% max.

Sizes: 2 in. x Down
1 in. x Down
20 Mesh x Down

Manganese-Nickel-Titanium

Titanium	46.5-48.5%
Manganese	6-8%
Nickel	29-31%
Aluminum	12.5-14.5%

Size: 2 in. x Down

Aluminum-Titanium

Regular Grade		High-Purity Grade	
Titanium	50 to 60%	Titanium	50 to 55%
Aluminum	40 to 45%	Aluminum	44 to 49%
Silicon	1.50% max.	Silicon	0.25% max.
Iron	2.00% max.	Iron	1.00% max.
		Carbon	0.15% max.

Crushed Size: ¼ in. x Down

NOW!

A TWO-TON LIFT

WITH HUSKY 100-POUND AIR HOIST

New Keller Tool air hoist weighs 100 pounds . . . raises a 4000-pound load at 10 feet per minute. Hoist is strong and powerful enough to handle the 2-ton load with complete safety.

New 2-ton hoist is powered by high-torque, axial-piston compressed air motor for positive starts and stops. A centrifugally governed, fully mechanical brake prevents slippage. Length of lift is 8 feet. Hook-to-hook dimension is only 23½ inches.

Has all the outstanding features of the Keller Tool air hoist line:

Lightweight—easy to move and hang.

Variable Speed—from creep to maximum.

One-Hand Control—of lifting, lowering, spotting.

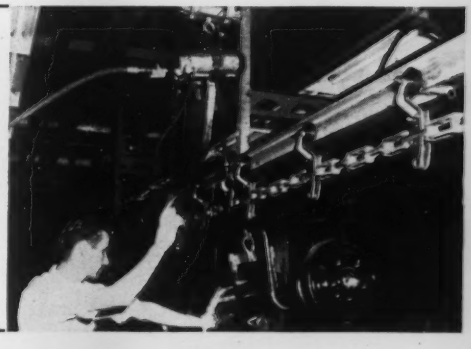
Safe in Heat or Dust—air motor doesn't spark . . . won't heat up.

Economical Operation—air consumption is low . . . requires little servicing or maintenance.

Operator Safety—powerful brake holds load regardless of air supply. An exclusive feature of the new two-ton hoist is a safety cable hole that provides extra safety for load and operator.

Keller Tool air hoists are available in lifting capacities of 150 . . . 300 . . . 500 . . . 1000 . . . 2000 . . . and *now* . . . 4000 pounds. Write for Bulletin 86.

Keller Tool air hoist, keeping pace with assembly line conveyor, lifts rear axle assemblies onto conveyor hooks.



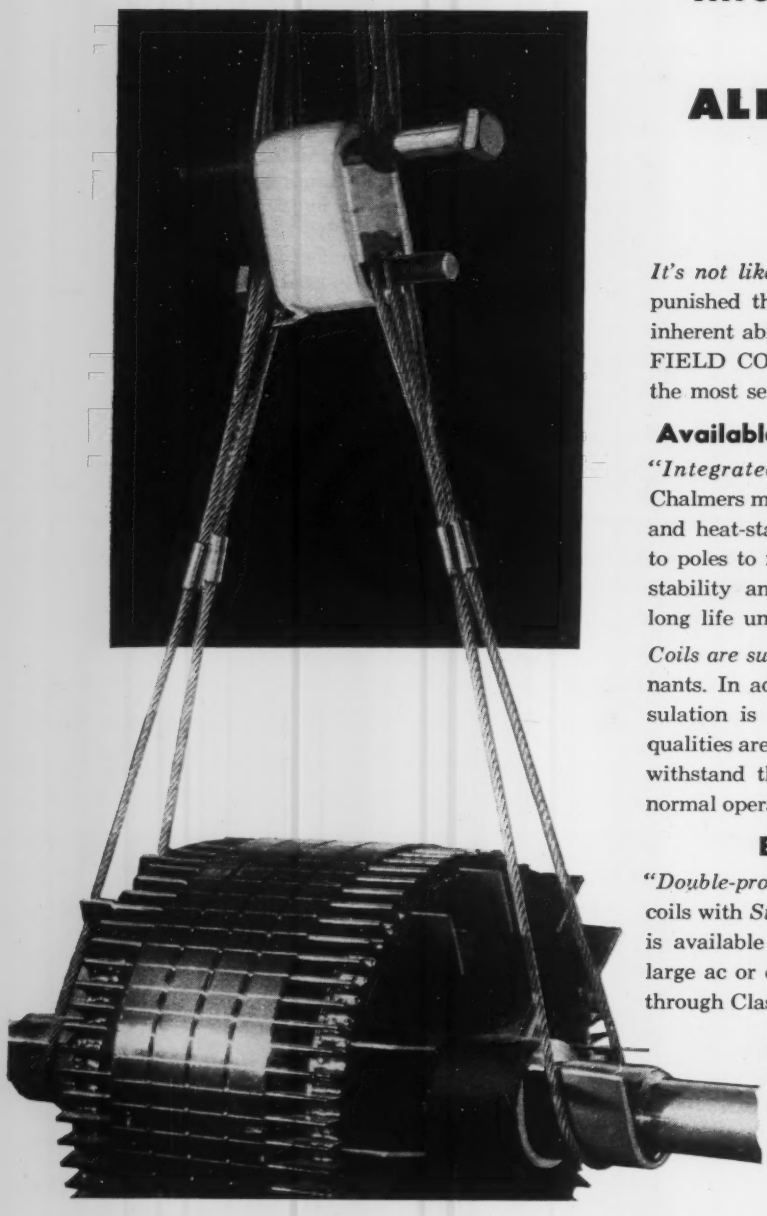
GARDNER-DENVER Since 1859 — KELLER TOOLS

ENGINEERING FORESIGHT—PROVED ON THE JOB
IN GENERAL INDUSTRY, CONSTRUCTION, PETROLEUM AND MINING

GARDNER - DENVER

Gardner-Denver Company, Quincy, Illinois

ONE-TON TEST proves physical strength of "Integrated" field coils in ALLIS-CHALMERS MOTORS



It's not likely a field coil of a motor would ever be punished this way. But tests like this illustrate the inherent ability of Allis-Chalmers "INTEGRATED" FIELD COILS to withstand the stresses created by the most severe loading conditions of a motor.

Available only on Allis-Chalmers Motors

"Integrated" field coils, available only on Allis-Chalmers motors, are enveloped in oriented glass fibers and heat-stabilized resins. These are securely locked to poles to resist mechanical force. High dimensional stability and tensile strength characteristics assure long life under the toughest of operating conditions.

Coils are surface sealed against atmospheric contaminants. In addition, the coefficient of expansion of insulation is similar to that of copper. Heat transfer qualities are excellent. "Integrated" coil structures can withstand the most severe thermal cycling found in normal operation.

Exclusive Allis-Chalmers

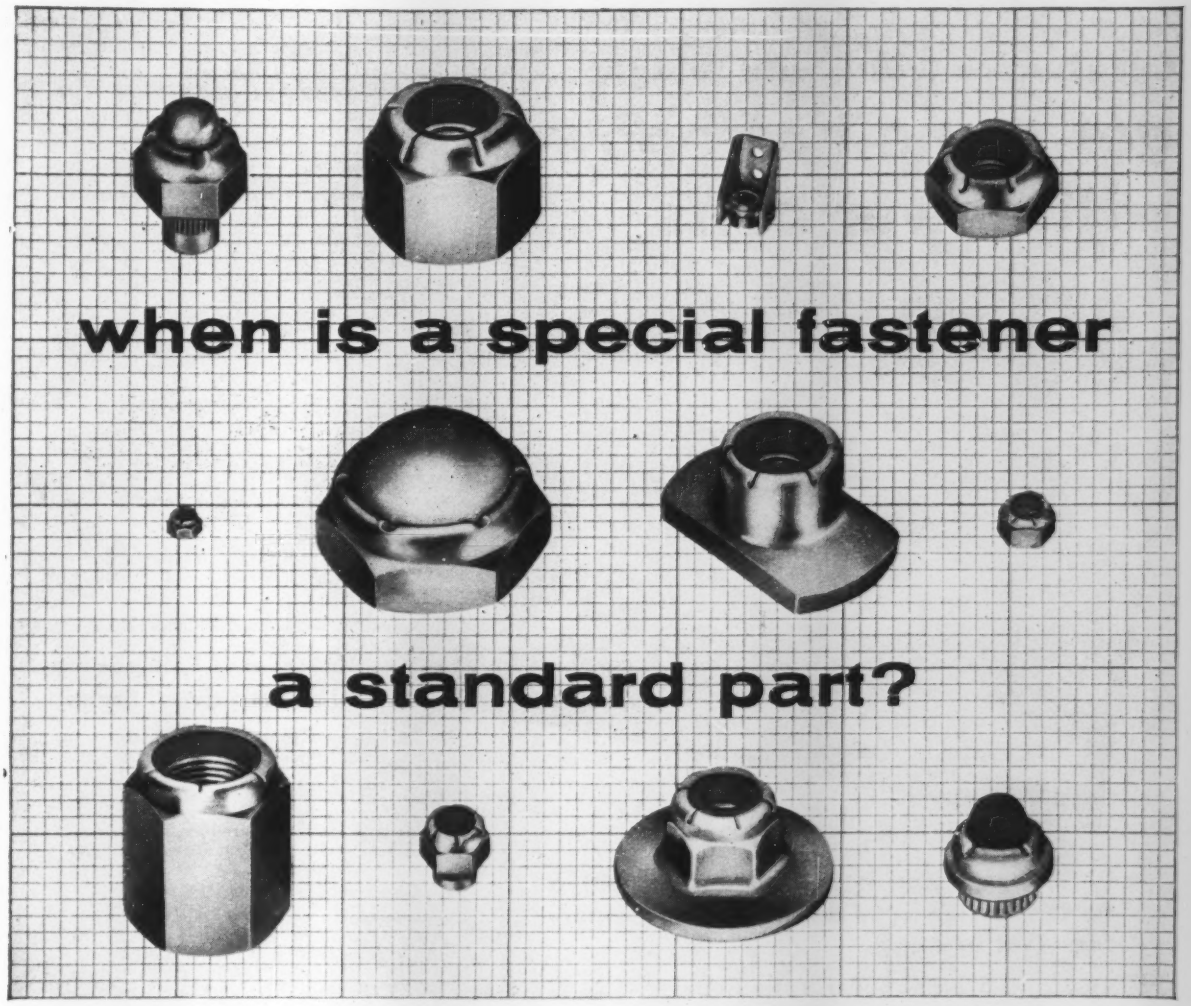
"Double-protection," combining new "Integrated" field coils with *Silco-Flex* all-silicone stator coil insulation, is available for rotating and stationary elements of large ac or dc machines with operating temperatures through Class B range.

For the whole story of Allis-Chalmers motors, contact your local A-C representative or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

Silco-Flex is an Allis-Chalmers trademark.

ALLIS-CHALMERS

A-5276



The answer is easy: when it's an ELASTIC STOP® nut. ESNA makes and stocks more types, shapes and sizes (in a larger variety of materials and finishes) than any other lock nut manufacturer. In fact, all of the nuts shown here are standard production parts.

Every one of these fasteners is self-locking anywhere on the bolt, will remain tight under severe vibration . . . yet they can be dis-assembled and re-used many times. What's more, the performance of the red locking insert has proved itself in critical applications on American heavy industrial equipment for more than twenty-five years.

All ESNA nuts are carefully controlled in manufacture as to finished dimensions, class of thread fit and finish. This control pays off—in uniform quality every time you order.

Simplify and speed up your purchases by sending for a free catalog on ESNA's extensive line.

ELASTIC STOP NUT CORPORATION OF AMERICA

ESNA® TRADE MARK

ROLLPIN TRADEMARK

Clip Coupon for Complete Catalog

Elastic Stop Nut Corporation of America
Dept. N26-560, 2330 Vauxhall Road, Union, New Jersey

Gentlemen: Please send me your free, complete ELASTIC STOP nut catalog.

Name_____ **Title**_____

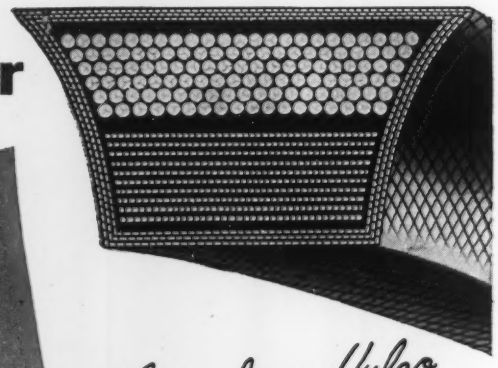
Firm_____

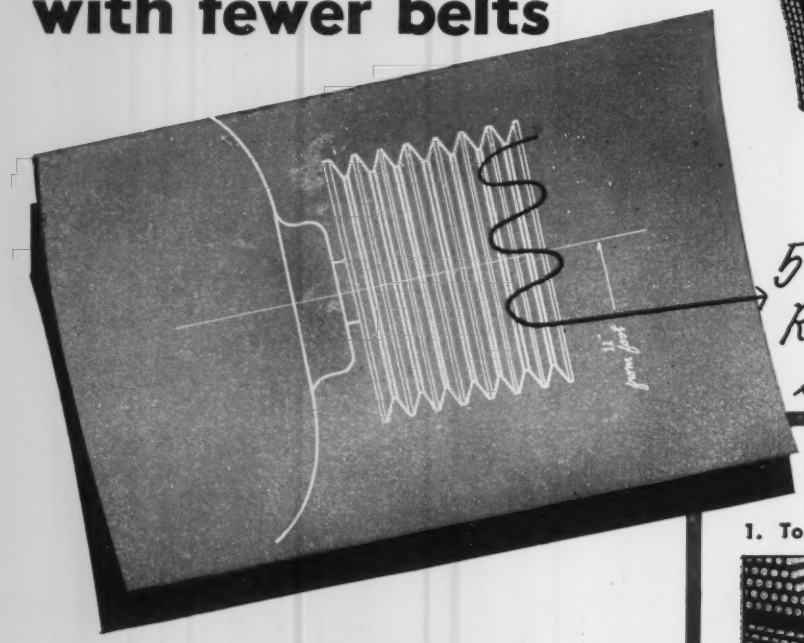
Street_____

City_____ **Zone**_____ **State**_____

Cut sheave width and weight...

get same horsepower with fewer belts





5 Gates Super Vulco Ropes do the work of 7 standard V-belts

Where space is limited and weight a factor, design your drive with this important fact in mind:

5 Gates Super Vulco Ropes do the work of 7 standard V-belts

That's because a Gates Super Vulco Rope has 40% more horsepower capacity — delivers more horsepower per dollar invested than any standard V-belt drive. Sheaves with fewer grooves cost less . . . weigh less . . . take less room. Drive design is invariably improved.

A wealth of drive data is quickly available to you. Simply call your nearby Gates distributor for a Gates V-belt specialist. Stocks carried in industrial centers around the world.

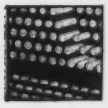
The Gates Rubber Company
Denver, Colorado

GATES Distributors are in the Yellow Pages

The Mark of Gates *Specialized* Research

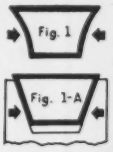
No other V-Belt has ALL these advantages

1. Tough, resilient Tensile Cords



Super strong resilient tensile cords provide 40% greater horsepower capacity . . . easily absorb heavy shock loads . . . reduce number of belts required . . . save weight and space.

2. Concave Sidewalls (U.S. Pat. 1813698)



Concave sides (Fig. 1) increase belt life. As belt bends, concave sidewalls become straight, making uniform contact with sheave groove (Fig. 1-A). Uniform contact means less wear on sides of belt . . . far longer belt life.

3. Flex-Weave Cover (U.S. Pat. 2519590)

A Gates exclusive: provides greater flexibility with far less stress on fabric. Cover wears longer . . . increases belt life . . . more power available to driven machine.

4. High Electrical Conductivity

Built into Gates Super Vulco Ropes for safer drives (in explosive atmospheres).

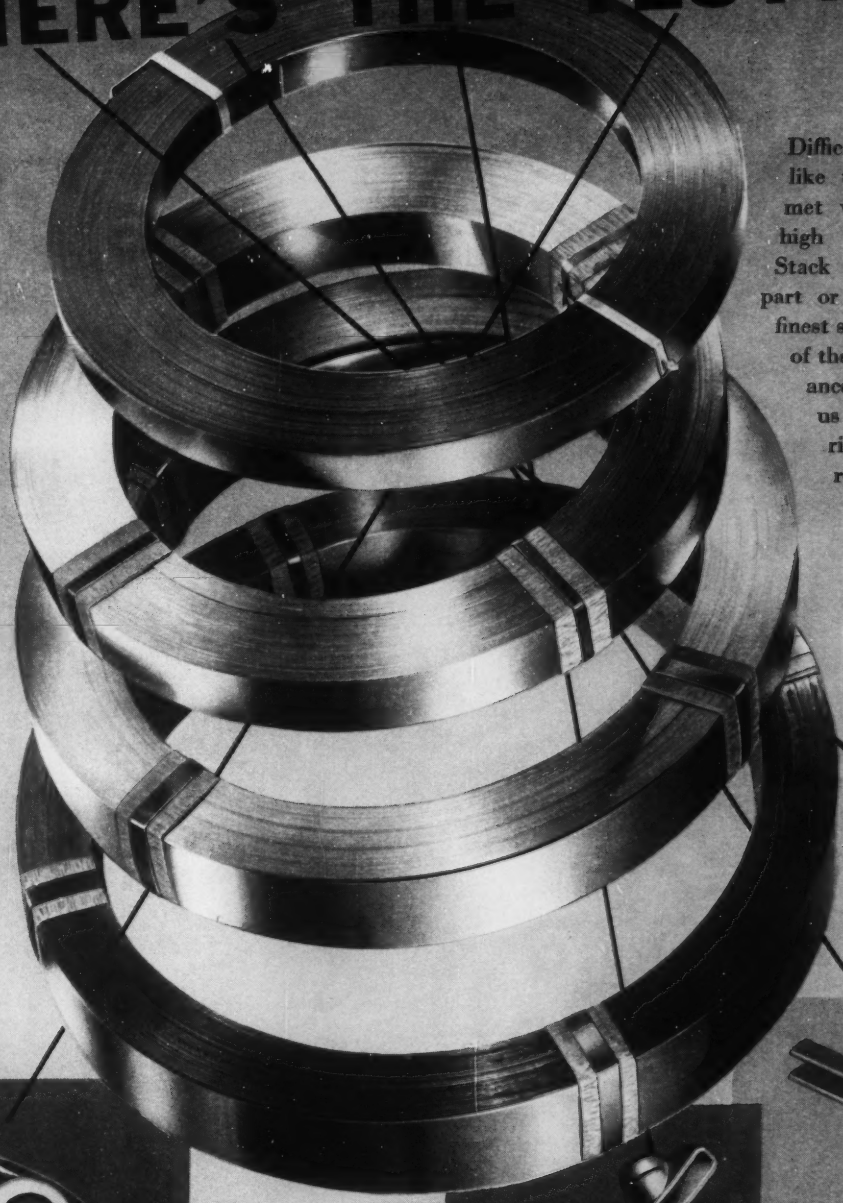
5. Oil, Heat, Weather Resistant

Special rubber compounds make Super Vulco Ropes highly resistant to heat, oil, and prolonged exposure to weather.

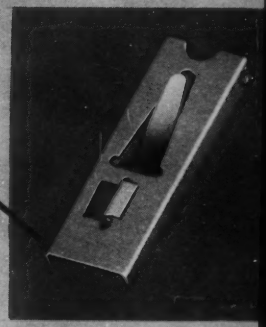
TPA 248

Gates Super VULCO ROPE Drives

HERE'S THE TEST...

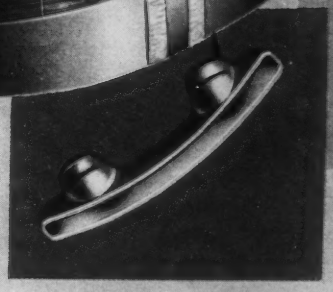


Difficult forming operations like these are successfully met with Wallace Barnes high carbon strip steels. Stack 'em up against *your* part or product . . . These finest steels will convince you of their all-around performance and workability. Let us help you select the right type for your requirement.



Blanked on 45° Angle

Thirteen Steps Progressive



Three Drawing Stations

All Flanging One Operation

WALLACE BARNES STEEL DIVISION

ASSOCIATED SPRING CORPORATION

BRISTOL, CONNECTICUT

DIVISIONS OF ASSOCIATED SPRING CORPORATION — COAST TO COAST

ALSO MAKERS OF SPRINGS • WIRE FORMS • SMALL STAMPINGS

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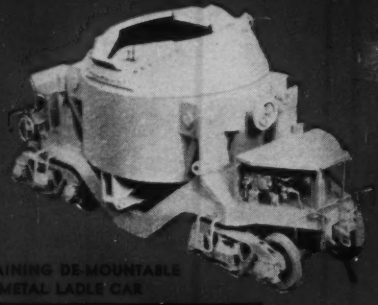
Pollock Experience at No Extra Cost

The William B. Pollock Company has been serving the iron and steel industry the world over since 1863.

Pioneers in heavy steel work, Pollock is excellently qualified, equipped and staffed to design and build your special heavy-duty equipment.

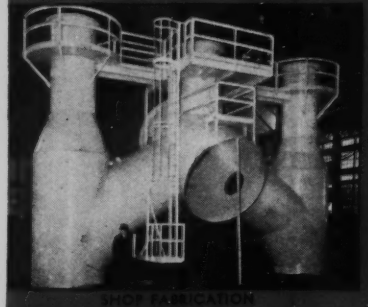
Pollock is known for its reliable, efficient precision work. You, too, can benefit from Pollock's broad experience.

BLAST FURNACE CINDER CAR AND OPEN HEARTH SLAG CAR

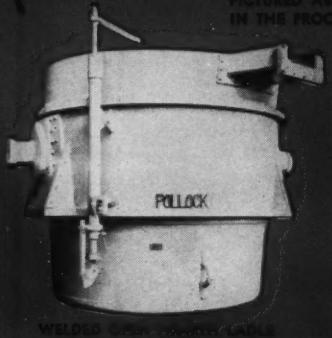


HEAT RETAINING DE-MOUNTABLE HOT METAL LADLE CAR

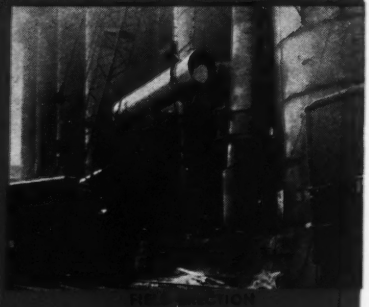
PICTURED ABOVE IS POLLOCK FIELD ERECTION EQUIPMENT IN THE PROCESS OF ERECTING A MODERN BLAST FURNACE



SHOP FABRICATION



WELDED OPEN HEARTH LADLE



FIELD ERECTION

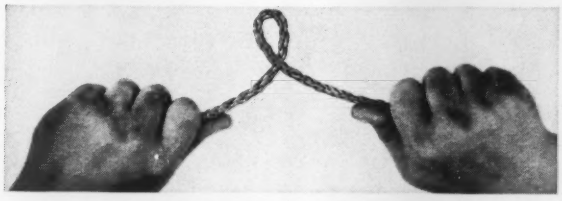
POLLOCK
SINCE 1863

THE WILLIAM B. POLLOCK COMPANY
YOUNGSTOWN · OHIO
STEEL PLATE CONSTRUCTION · ENGINEERS · FABRICATORS · ERECTORS

BLAST FURNACES · HOT METAL CARS AND LADLES · CINDER AND SLAG CARS · INGOT MOLD CARS · CHARGING BOX CARS · WELDED OPEN HEARTH LADLES

Tuffy® Sling Bulletin

Reporting the Outstanding Performance of Union Wire Rope's Machine-Braided Wire Fabric Slings.

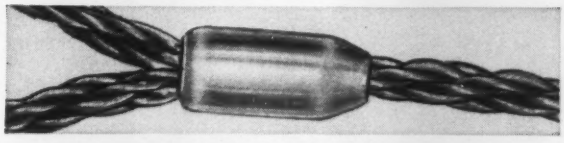


Tuffy's a Hard One to Kink... and a Breeze to Unkink!

You'll find it next to impossible to kink a Tuffy sling by hand. If you succeed, even with the aid of a vise, see how easily the braided fabric can be straightened out with no material damage.

Tuffy's Streamlined Ferrule is Pressed On Over Tucked Eye-Splices for 100% Strength of Sling

Tremendous machine pressure swages Tuffy's smooth-edged metal ferrule around the tuck splice. Metal virtually "flows" into the braided fabric interstices. This compressive treatment gives the eye of the sling 100% of the strength of the wire fabric. Eyes *stay* spliced!



Tuffy Hoist Line Delivers Big Extras of Dependability and Long Wear

Tuffy Hoist Line is a special rope construction for hoisting on all types of over-head, stiff leg and mobile cranes, derricks and clamshells. Combines extra flexibility and toughness to absorb load shocks. Tuffy slings and hoist lines work with hand-and-glove harmony to cut hoisting costs and downtime in every kind of materials handling.

Your Tuffy Distributor will help you give Tuffy Slings and Hoist Lines "the works" test on the job you choose

FREE! *Send Coupon for Handbook now*

For Canada, Safety Supply Co., Toronto

Give Tuffy "the Works," then Take a Long Look at the Increase in Sling Service You Get Per Dollar

Tuffy asks no coddling. Put Tuffy slings on your toughest jobs. Give them the "full treatment" of hard service. They'll take it, and then some. And you'll be ahead in dollars saved by Tuffy's longer wear and faster handling. The secret is the patented machine-braided construction of Tuffy slings. It produces a combination of extra flexibility and extra toughness never possible with ordinary wire rope — and a big step ahead of costly hand-braided slings. This 9-part Tuffy fabric is precision-braided by machine in a way that eliminates the inequalities of hand-braiding. Tuffy Slings have no cores. Even when one of the 9 parts is cut or broken, it does not result in stranding.

Watch Your Men Sling Loads Faster, Easier, with Greater Safety

Tuffy fabric and Tuffy's pressed-on ferrule team up to speed up sling work. The high flexibility and kink resistance of Tuffy slings make for smooth handling, and the Tuffy ferrule makes a pulled-out splice virtually a thing of the past. Because the ends of the ferrule are swaged flush with the machine-braided strands, there are no projections to snag on loads or injure hands. No wonder handlers work faster, safer, with Tuffy slings.

union Wire Rope **corp.**

2160 Manchester Avenue, Kansas City 26, Mo.

Specialists in high carbon wire, wire rope, braided wire fabric, stress relieved wire and strand

MY NAME_____ TITLE_____

COMPANY NAME_____

ADDRESS_____

3. CITY_____ ZONE____ STATE_____

Number 1 in a Screw Research Association Series on Industrial Statesmen

GEORGE ROMNEY
praises quality control

"Control that assures a good quality product is one of the most important assets any industrial organization can have. It takes consecutive purchases before buyers realize that dependable quality is constant — but once they're really convinced, that good will lasts a long time. The more time you spend in improving production, and the more care you use in selecting top quality materials and parts, the easier it is for you to win your sales battle."

George Romney

President, American Motors Corporation
President, National Automobile Manufacturers Association

Positive Protection for YOU in the Quality-Control of Phillips Screws

Industrial Statesmanship You Can Depend On

Screw Research Association members sponsor the Phillips Cross-Recessed Head Standards Committee that sets up the strict quality control for these fasteners. This means common adherence to the best possible dimensional standards using recommended inspection gauges and gauging methods.

Product reliability in Phillips Screws demands that they be entirely trouble-free. Deliver every advantage inherent in the Phillips Recess design. Recess dimensions must meet the close tolerance standards established by the Phillips Cross-Recessed Head Standards Committee.

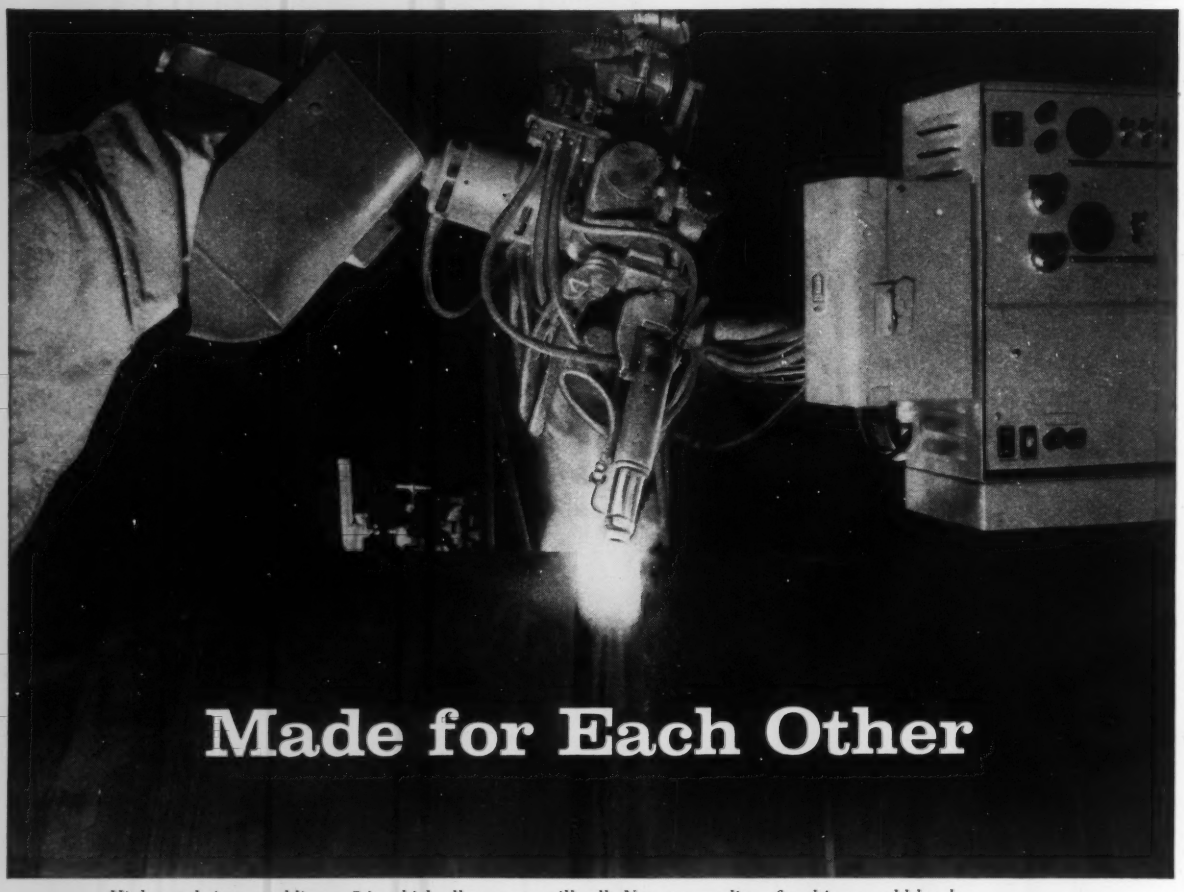
Phillips Screws made by these companies improve your products and reduce your production costs.

Members of Screw Research Association . . .

American Screw Company • Atlantic Screw Works, Inc. • The Blake & Johnson Co. • Central Screw Company • Continental Screw Co. • Elco Tool and Screw Corporation • Great Lakes Screw Corp. • The H. M. Harper Company • The Lamson & Sessions Company • National Lock Company • The National Screw & Manufacturing Company • Parker-Kalon Division, General American Transportation Corporation • Pheoll Manufacturing Co. • The Progressive Manufacturing Company Division, The Torrington Company • Scovill Manufacturing Company • Shakeproof Division Illinois Tool Works • The Southington Hdwe. Mfg. Company Sterling Bolt Company • Universal Screw Company • Wales-Beech Corporation

You can rely on these sources . . . for product reliability

THE GENUINE QUALITY PHILLIPS SCREWS



High-speed sigma welding a 5-in. thick alloy paper mill roll. Note top quality of multipass weld beads.

. . . SIGMA WELDING AND ALLOYED METALS

Because sigma welding joins modern alloys of varying types and thicknesses in fast, clean operations, it has gained recognition by manufacturers throughout industry as the most efficient welding process for a wide range of alloy fabricating jobs.

Combines Advantages

Sigma welding is an extremely versatile process—it joins metal alloys ranging in thickness from 0.035 inch to more than five inches (in multipass operations)—and attains up to four times faster wire deposition than other welding processes.

Gain the full advantages of modern sigma welding . . . Contact your local LINDE Representative for complete information, or write today for free literature.

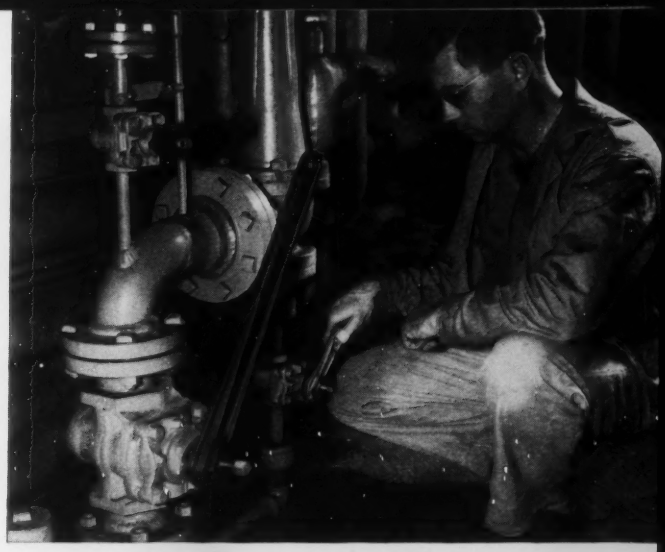
Linde Air Products Company
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.

Offices in Other Principal Cities
In Canada: LINDE AIR PRODUCTS COMPANY
Division of Union Carbide Canada Limited, Toronto

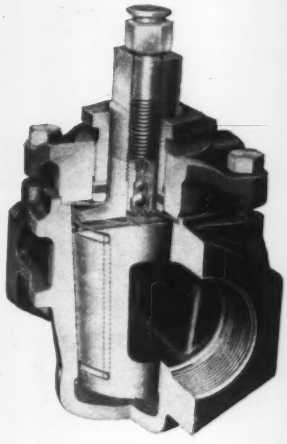
The term "Linde" is a registered trade-mark of Union Carbide and Carbon Corporation.

Linde
Trade-Mark

How
ROCKWELL-
Nordstrom
VALVES



Cut Flow Control Costs



For forty years, Rockwell-Nordstrom *lubricated* plug valves have been proving that they cut costs by doing their job better, longer, with less maintenance. Here's why:

1. Pressurized lubricant forms a positive, leakproof seal, preventing dangerous or costly leakage.
2. Metal-to-metal friction is eliminated by lubricant. Maintenance, repair and down time costs are slashed on even the toughest service.
3. Costly production loss by stuck valves is prevented. The tapered plug seated on lubricant affords *instant*, quarter-turn operation.

Rockwell-Nordstrom valves cost about the same, often less, than ordinary valves. Their cost to use and trouble-free dependability cannot be matched by any other valve. Available in semi-steel, steel, stainless and corrosion resisting metals, in a full range of sizes to 30″. Send the coupon today for complete details.

Canadian Valve Licensee: Peacock Brothers Ltd.

ROCKWELL-
Nordstrom
VALVES

Lubricant Sealed for Positive Shut-off

ROCKWELL MANUFACTURING COMPANY, Pittsburgh 8, Pennsylvania

☐ Please send me Bulletin V-215.

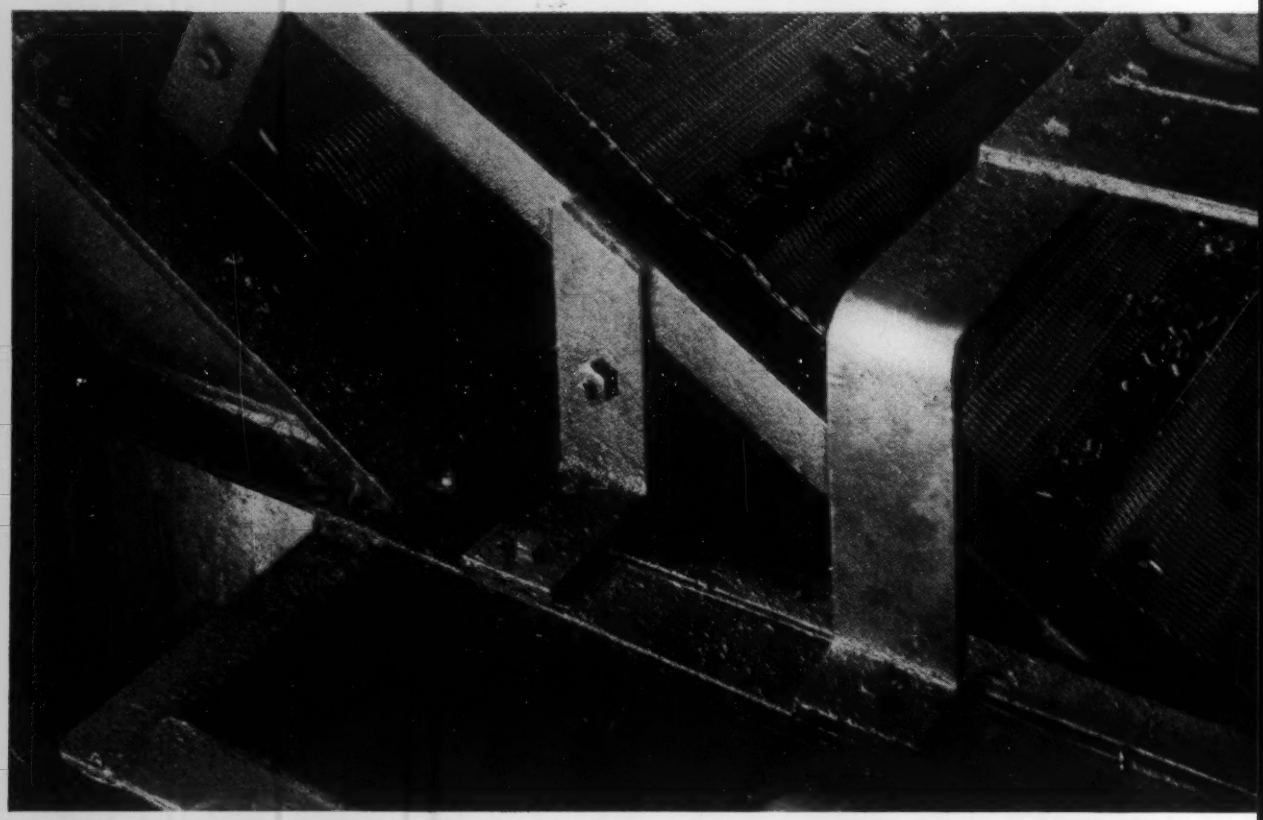
☐ Please send me name of nearest Rockwell-Nordstrom industrial distributor.

Name_____ Title _____

Company_____

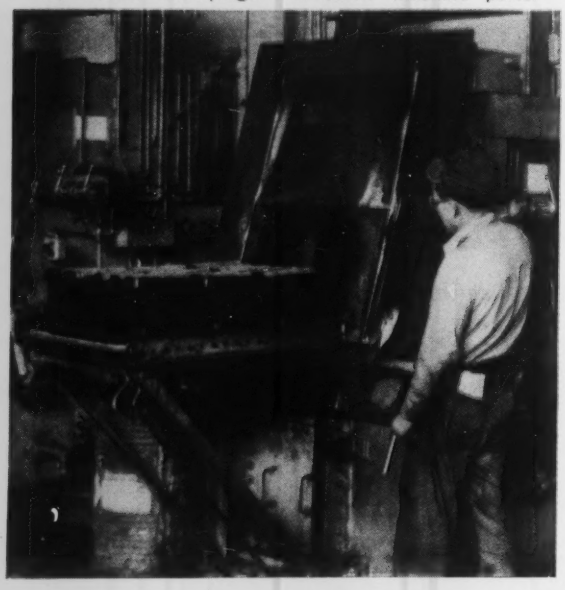
Street_____

City_____ Zone_____ State_____



Gulf Super-Quench possesses remarkable service stability—One reason why it's the high-speed quenching oil used by Lindberg for the past ten years.

Batch elevator type atmosphere furnace used by Lindberg for clean neutral hardening, gas carburizing and carbo-nitriding. Super-Quench is a "must" on low carbon stampings and screw machine parts.



why GULF fast quenching oil

Here's why in the words of Norman O. Kates, Chief Metallurgist of Lindberg: "We appreciate Super-Quench's versatility to effectively harden parts of varying cross sections made of low hardenability steels. A 12,000 gallon central storage system pumps Super-Quench to various tanks throughout the plant. Diverse products such as production stampings, shafts, gears, jigs and fixtures are quenched to uniform hardness with minimum distortion."

Here Super-Quench effectively hardens pieces of low hardenability steel with a minimum of distortion.
Tom Corcoran, Lindberg Plant Superintendent, and V. O. Chase, Gulf Sales Engineer, inspect extension sockets coming out of Super-Quench, after going through a continuous atmosphere controlled furnace.

SUPER-QUENCH is the used by Lindberg Steel Treating Company

Melrose Park, Ill.

Super-Quench offers you higher initial quenching speed than conventional quenching oils. It achieves deeper, more uniform hardening of many types of steel and produces less distortion in pieces of varied sections and shapes.

Look into *all* the advantages of Gulf Super-Quench. Contact your nearest Gulf office and ask for a Gulf Sales Engineer to call. Or send the coupon for free booklet.

GULF OIL CORPORATION
1822 Gulf Building, Pittsburgh 30, Pa. S

Please send me, without obligation, a copy of your 24-page booklet on the uses and advantages of Gulf Super-Quench.

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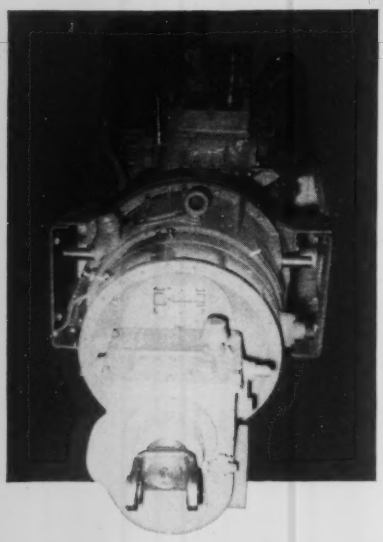
GULF

THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS

Fast, economical handling of steel...

with Twin Disc Torque Converter-Equipped Gerlinger Carriers



Twin Disc Model CF Torque Converter, as applied to the Model SC-50 Gerlinger Carrier, shown above.

For faster, more economical handling of steel, a leading Midwest steel company depends on two Model SC-50 Gerlinger Carriers, both equipped with Twin Disc Model CF Torque Converters.

These 50,000 lb. working capacity carriers are presently stockpiling steel from the mill to the stockyard. The company also plans to haul coiled sheet from their rolling mill to the production plant, and in this operation the carriers will replace gondolas on the railroad.

The Twin Disc Converters provide a *smooth, steady, flexible* flow of power from 180 horsepower Hercules RXLDH engines, to the carriers. Through the exclusive Twin Disc Three-Stage design, the converter multiplies engine output torque up to *six times*—consequently, harmful, costly engine lugging and stalling are eliminated. Through *fluid* connection, overloads, shock loads and vibrations are cushioned *out*—which means longer life, and less maintenance on *both* driving and driven equipment.

In addition, the torque converter permits delicate "inching" of material into place without jerking. It also enables the carrier to do a smoother, easier job of spotting the load, and to maneuver in and out of tight places.

Today, Twin Disc offers *the most complete—the most versatile* line of torque converters available — both single-stage and three-stage—for all internal combustion engine applications from 30 to 1000 horsepower.

For complete information, consult Twin Disc *Specialists* — request *Single-Stage* Bulletin 508, or *Three-Stage* Bulletin 135-E.

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

TWIN DISC
Torque Converters

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois

BRANCHES OR SALES ENGINEERING OFFICES: CLEVELAND • DALLAS • DETROIT • LOS ANGELES • NEWARK • NEW ORLEANS • TULSA

USS "T-1" STEEL WILL SAVE $800,000 IN FIRST MAJOR BRIDGE APPLICATION

Next year the State of California will open a new toll bridge paralleling an existing structure across the Carquinez Straits. This will be the final step in a mammoth project underway to relocate some twelve and a half miles of very busy highway connecting the San Francisco Bay Area with the Sacramento Valley.

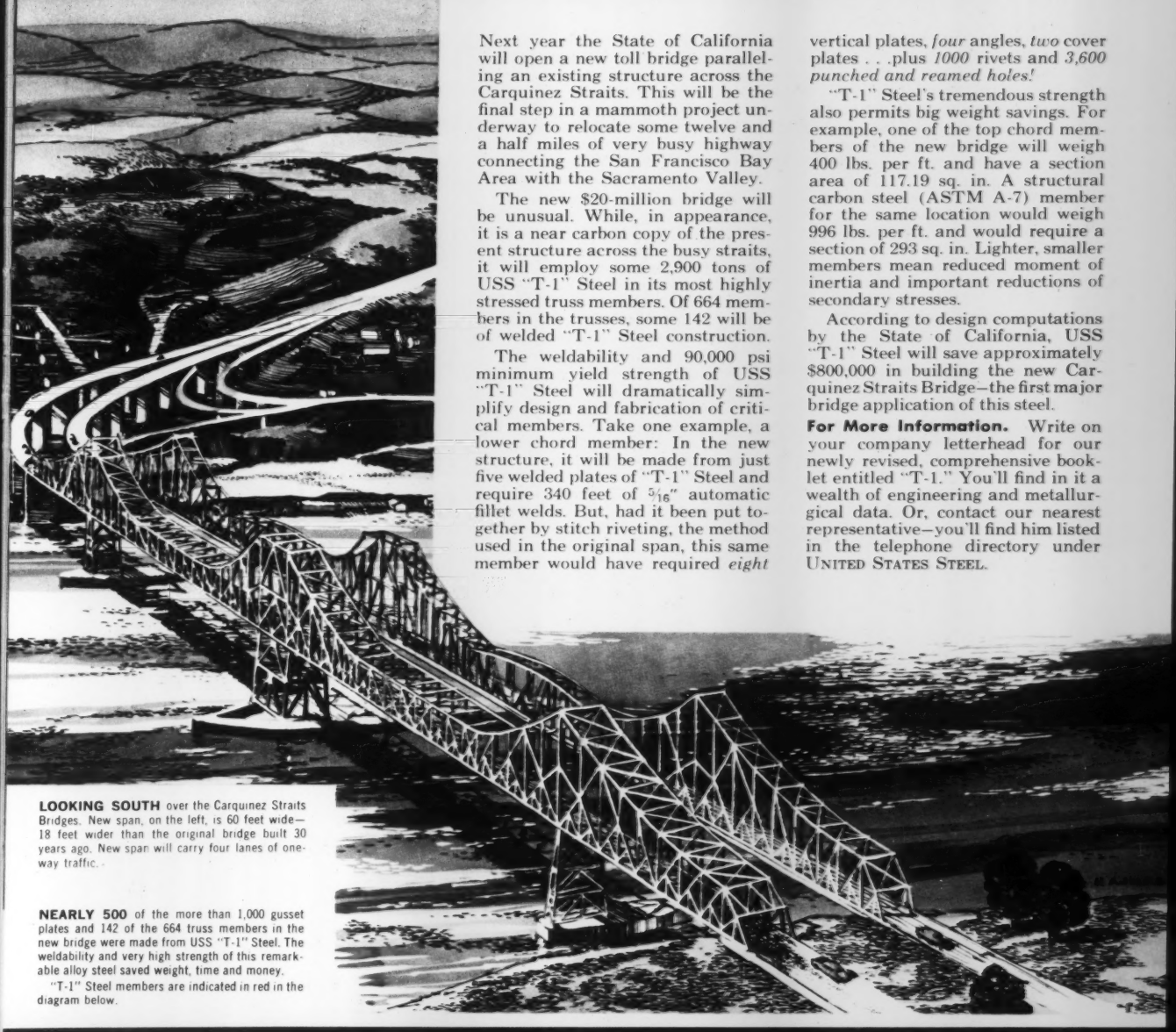
The new $20-million bridge will be unusual. While, in appearance, it is a near carbon copy of the present structure across the busy straits, it will employ some 2,900 tons of USS "T-1" Steel in its most highly stressed truss members. Of 664 members in the trusses, some 142 will be of welded "T-1" Steel construction.

The weldability and 90,000 psi minimum yield strength of USS "T-1" Steel will dramatically simplify design and fabrication of critical members. Take one example, a lower chord member: In the new structure, it will be made from just five welded plates of "T-1" Steel and require 340 feet of $\frac{5}{16}$" automatic fillet welds. But, had it been put together by stitch riveting, the method used in the original span, this same member would have required *eight* vertical plates, *four* angles, *two* cover plates . . .plus *1000* rivets and *3,600 punched and reamed holes!*

"T-1" Steel's tremendous strength also permits big weight savings. For example, one of the top chord members of the new bridge will weigh 400 lbs. per ft. and have a section area of 117.19 sq. in. A structural carbon steel (ASTM A-7) member for the same location would weigh 996 lbs. per ft. and would require a section of 293 sq. in. Lighter, smaller members mean reduced moment of inertia and important reductions of secondary stresses.

According to design computations by the State of California, USS "T-1" Steel will save approximately $800,000 in building the new Carquinez Straits Bridge—the first major bridge application of this steel.

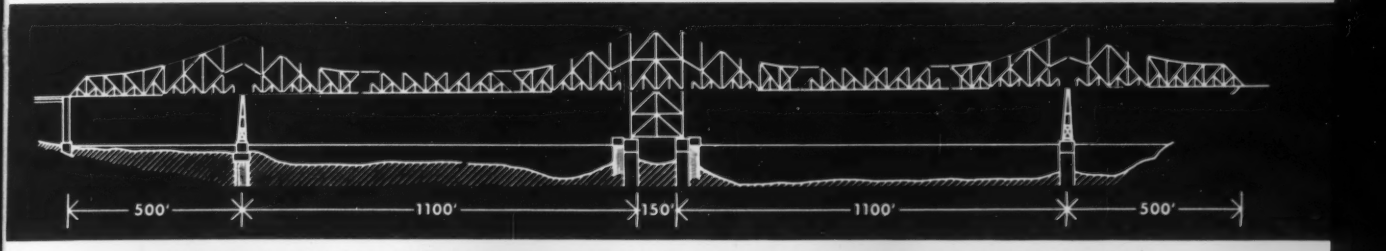
For More Information. Write on your company letterhead for our newly revised, comprehensive booklet entitled "T-1." You'll find in it a wealth of engineering and metallurgical data. Or, contact our nearest representative—you'll find him listed in the telephone directory under UNITED STATES STEEL.



LOOKING SOUTH over the Carquinez Straits Bridges. New span, on the left, is 60 feet wide—18 feet wider than the original bridge built 30 years ago. New span will carry four lanes of one-way traffic.

NEARLY 500 of the more than 1,000 gusset plates and 142 of the 664 truss members in the new bridge were made from USS "T-1" Steel. The weldability and very high strength of this remarkable alloy steel saved weight, time and money.

"T-1" Steel members are indicated in red in the diagram below.

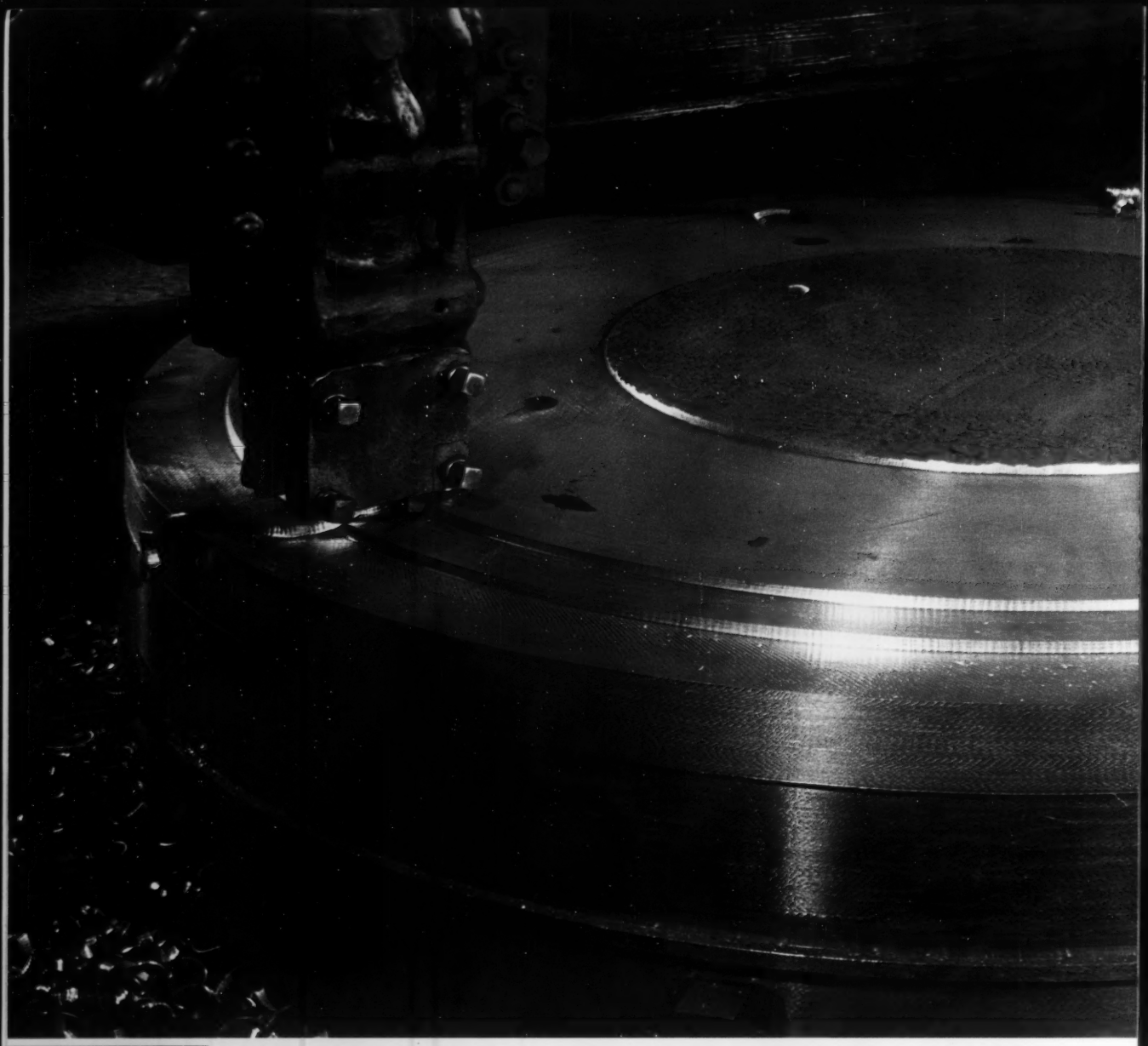


UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS "T-1" CONSTRUCTIONAL ALLOY STEEL

"USS" and "T-1" are registered trademarks.

UNITED STATES STEEL



"A good inspector must have

says **Thomas A. Pugh**
USS General Supervisor, Inspection

ANY MANUFACTURER worth his salt will admit that a tight inspection system is based on "the critical eyes" of his inspectors. This is especially true when you're dealing with unusual forgings that are worth many thousands of dollars.

Forgings like the nuclear reactor disc in the picture are particularly susceptible to trouble. It was forged from a chromium-nickel stainless steel ingot—a critical operation, since stainless has a very narrow temperature range in which it can be forged. To control this, a metallurgical observer stayed with the piece *every minute* it was being forged and took frequent temperature readings.

After the delicate heat-treating process, physical test bars were drilled out of the piece with a trepanning tool and subjected to accurate tensile and grain size tests. For hours, an inspector checked its soundness with a sonic crystal. Finally, we were sure that the piece was worthy to be called a USS Quality Forging.

Depending on the application and the specifications, some USS Quality Forgings require a great many more inspection steps which are sometimes spread over many weeks of shop processing. There are eleven forgings inspectors, reporting to three foremen, and they all work under the careful eye of Thomas Pugh. That's his picture on the left.

a critical eye,"

Mr. Pugh is in his 32nd year with United States Steel. He spent 30 of them as an inspector—the last 16 exclusively on forgings. Few men *anywhere* have his deep knowledge of inspection techniques and equipment, and how to use them to check large section forgings designed for critical, high-stress applications. Our faith in him is obvious: he has the authority to reject any USS Forging that does not meet our standards of quality.

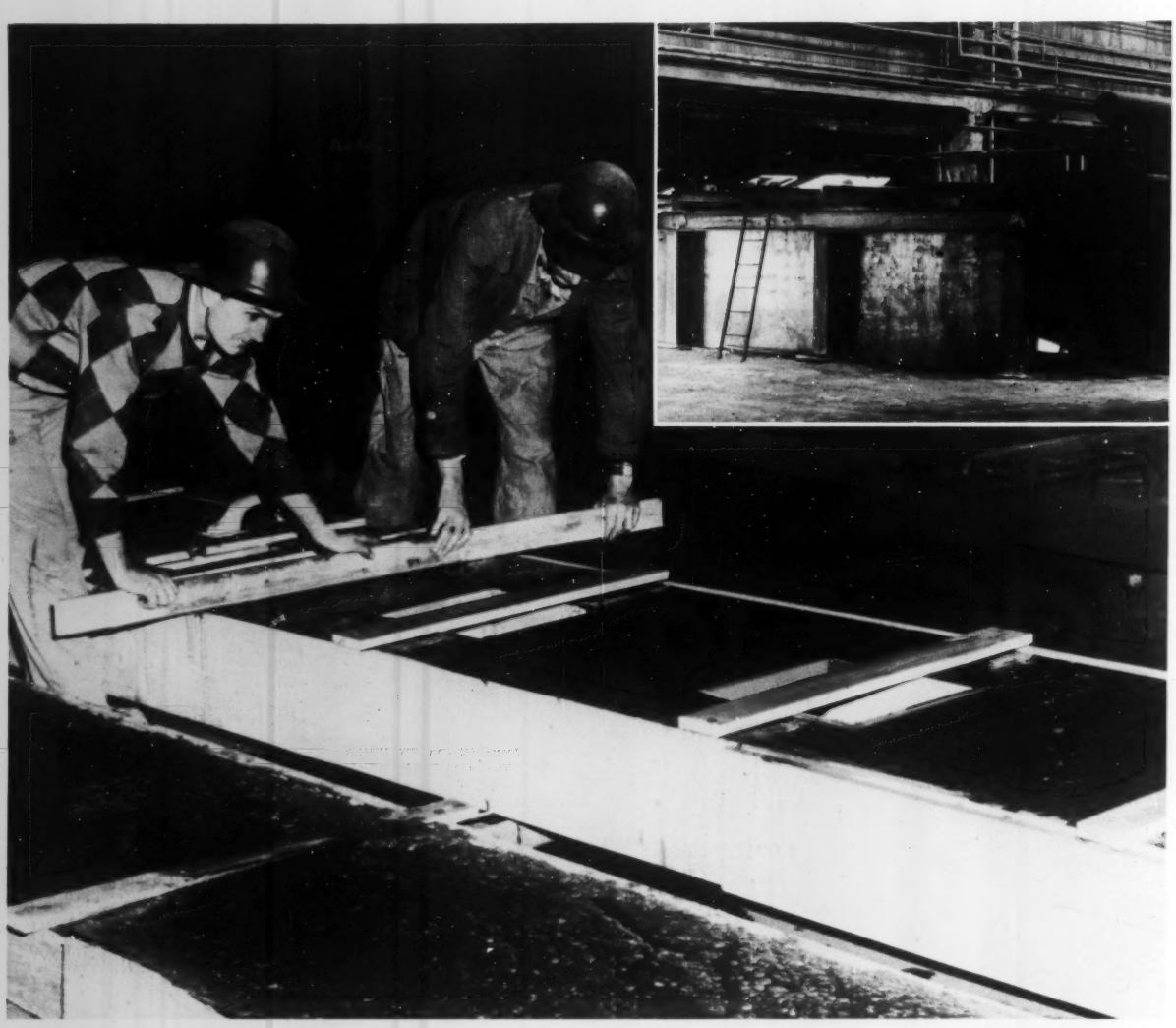
In every step of the manufacturing operation—from melt shop to shipping floor—men like Thomas Pugh keep close watch over your USS Quality Forging, and they have the equipment to back them up. We'd appreciate your inquiries or requests for our free 32-page booklet on USS Quality Forgings. Just write United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

USS QUALITY FORGINGS

heavy machinery parts . . carbon, alloy, stainless
forged steel rolls and back-up roll sleeves
electrical and water wheel shafts
specialty forgings of all types

USS

UNITED STATES STEEL



REHEAT FURNACE at United States Steel plant, Duquesne, Pa., was made entirely with precast Lumnite refractory concrete panels using tilt-up construction. The 20'x 40' installation was built with 18 precast sections: 4 panels each in the 2 side walls; one panel each in front and back walls; and 8 panels in the roof.

New way to build industrial furnaces—precast refractory concrete slabs of Atlas LUMNITE*

- Resists extreme variations in temperature and thermal shock due to rapid heating and cooling.
- Durability under severe operating conditions.
- Placement of Lumnite-made refractory concrete is fast and easy—service strength is reached within 24 hours.

For maximum convenience, use Lumnite-made castables. These are pre-mixed, ready for use, and are made and distributed by leading manufacturers of refractories. For more information write: Universal Atlas, 100 Park Avenue, New York 17, N. Y.

*"LUMNITE" is the registered trademark of the calcium-aluminate cement manufactured by Universal Atlas Cement Company.

L-148

UNIVERSAL ATLAS CEMENTS

USS

UNIVERSAL ATLAS CEMENT COMPANY—member of the industrial family that serves the nation—**UNITED STATES STEEL**

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William H. Martindill, ***President of South Bend Tackle Co., Inc. tells how***

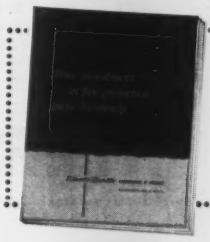
"I landed an annual $9,298.00 insurance saving with 'Automatic' Sprinkler Fire Protection!"

"To realize this insurance saving we installed 'Automatic' Sprinkler Systems in our Spencer and Maquoketa, Iowa Plants at a cost of $31,650.00.

"Before we installed 'Automatic' Sprinklers our annual insurance cost for these two plants was $10,274.00.

"After we installed 'Automatic' Sprinklers our annual insurance cost for the two plants was reduced to $976.00.

"Best of all, we no longer worry about fire destroying our facilities for producing quality fishing tackle. 'Automatic' Sprinklers provide the kind of proven fire protection our metalworking, wood, plastics, and painting operations require and now get."



WRITE FOR NEW BROCHURE "How investment in fire protection pays dividends".

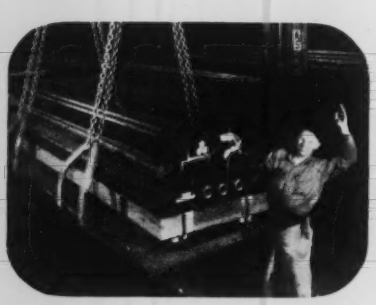
***"Automatic" Sprinkler* CORPORATION OF AMERICA**

YOUNGSTOWN 1, OHIO • OFFICES IN PRINCIPAL CITIES OF NORTH, CENTRAL AND SOUTH AMERICA

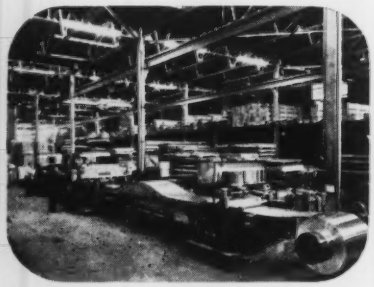
Six ways
Ryerson can serve you

Chances are that when you think of steel from stock, Ryerson springs first to mind. And for good reason. Every kind of steel, every shape and size, is immediately available from our tremendous reservoir.

But perhaps you don't always remember that Ryerson offers you much more—many other important products and services such as aluminum, plastics and fabricated construction steel. The pictures below illustrate the extent of our service. For a complete listing see the familiar red Ryerson catalog. Then as your needs arise—or whenever you have a question of selection, fabrication or application—look to Ryerson as your most complete and dependable source of help.

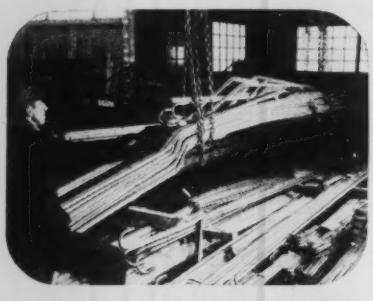


STEEL FROM STOCK
Carbon steels, alloys, stainless—bars, structurals, plates, sheet and strip, tubing—you can get quick shipment of one piece or truckloads from the world's largest steel stocks, at Ryerson. Get the steel with the certified seal—of quality.

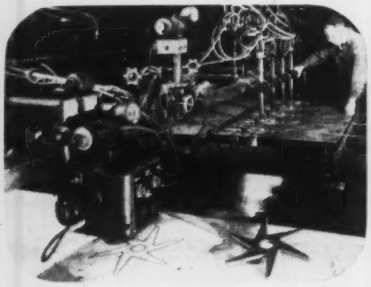


ALUMINUM FROM STOCK
In areas served by our Chicago, Milwaukee, New York, Boston and Connecticut plants, draw on Ryerson stocks for aluminum too—sheets, coils, bars, plates—practically any aluminum requirement in stock sizes or cut to your order.

PLASTICS FROM STOCK
The convenience and dependability of Ryerson service is also available to buyers of industrial plastics—PVC pipe, valves and fittings, sheets and rods, rigid Kralastic pipe, flexible polyethylene pipe and tubing, etc.



FABRICATED CONSTRUCTION STEEL
Re-bars, spirals, etc. for reinforced concrete construction are fabricated at Ryerson plants from coast to coast. Also, at Chicago, Ryerson fabricates structural steel for the framework of buildings, bridges, etc.



FLAME CUT STEEL SHAPES
Your nearby Ryerson plant can quickly flame cut almost any shape from carbon, alloy or stainless steel—producing a single piece or thousands accurate to size and ready for your application. We take the work load—you save money.

MACHINERY AND TOOLS
The broadest line of metal-working equipment available from a single source is offered by the Ryerson Machinery and Tool Division. You can choose from thousands of types and sizes produced by nearly one hundred manufacturers.

RYERSON STEEL

In stock: Carbon, alloy and stainless steel—bars, structurals, plates, sheets, tubing, industrial plastics, machinery & tools, etc.

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STEEL

May 20, 1957

Metalworking Outlook

Trouble Ahead on Short Work Week

Preliminary skirmishes on the short-week question indicate serious labor troubles in the auto industry next year. General Motors Corp. and Ford Motor Co. have followed American Motors Corp. in rejecting the United Auto Workers proposal for a labor-management study of the issue. Chrysler and Studebaker-Packard are expected to follow suit. No one seriously believes the union wants only 32 hours of work. Its aim is to lengthen overtime and its higher pay rates. A good bet is that the UAW will concentrate on Ford at showdown time because its Local 600 has been leading the agitation for the short week. Charges on the matter already being hurled by both sides indicate an auto strike may come in 1958.

7 Million Autos in 1958?

The economists are figuring that the possibility of such a walkout will spur early sales of 1958 models. A 6.2 million car production year for calendar 1957 will be possible, the reasoning goes, because of peak assemblies on the 1958s this October, November and December. What about output in 1958? If strikes don't come, or if they are short, look for production of about 7 million autos.

Because of Dave Beck

Union leaders claim the Dave Beck affair has set back their hopes for big gains in organizing white-collar workers this year (see page 95). But they believe that when the furor has died down they'll be able to make some headway. Today, some 18 million white-collar workers are unorganized —about half are clerical personnel. Not more than 2.8 million white-collar people are organized. In 1900, about 20 per cent of the work force were office personnel. The percentage climbed to 33 by 1950.

Using Scientific Manpower

A 50 per cent increase in the number of patent disclosures recorded by research personnel and a turnover rate of only 0.1 per cent (national average is 3 to 5 per cent) are among the results claimed for Universal Oil Products Co.'s manpower program. The company: 1. Separates labs and administrative offices. 2. Sees that well-educated people don't do "bottle washing" jobs. 3. Hires its top research people only when they are unanimously approved by its research directors. 4. Encourages continuing professional education. 5. Reviews salaries regularly.

Record Employment by Midsummer

Look for national job totals to hit all-time highs this year. Nearly 64 million are employed now. Some 68 million will be drawing pay checks by midsummer. Unemployment will remain close to the 3-million mark the

rest of the year. Average hourly earnings should continue to rise. For all manufacturing, they stood at $2.05 in mid-March.

Memo on Steel Companies

National Steel Corp. is pausing in its expansion drive to look over "recent advances in steel technology." National wants to look into such developments as direct reduction of ore . . . Carpenter Steel Co. is discussing the possible acquisition of bankrupt Northeastern Steel Co., Bridgeport, Conn., with that company's trustees . . . Republic Steel Corp. Chairman Charles M. White predicts steel needs by 1967 should hit 160 million ingot tons yearly.

Aluminum Bids for Can Market

Aluminum companies have their sights on the huge can market (42 billion annually). Victor Metals Products Corp., Newport, Ark., expects to be producing cans in a pilot plant before year end. Kaiser Aluminum says it has a 5.5 million can order from a food processor. The company will start producing cans from aluminum sheets at its new plant in Wanatah, Ind., this fall.

April Housing Starts Up

Housing starts rose seasonally in April but were at the lowest level for the month since 1949. Work was begun on 92,000 public and private dwelling units last month. This was 11 per cent above the March figure but 17 per cent below that for April, 1956. April marks the first upturn in the seasonally adjusted rate since last October.

BDSA Budget Hopes Look Up

Tip at presstime: The Senate Appropriations Subcommittee restored $2.1 million to the Business & Defense Services Administration budget. The House previously cut it by $3.5 million. If the Senate's recommendation goes through, it means BDSA will wind up with $1.4 million less than it asked for.

Straws in the Wind

Major U.S. manufacturing companies expect 30 to 80 per cent of their growth in the next three years to come from new products not now manufactured, according to a survey by Booz, Allen & Hamilton, management consulting firm . . . A small vein of high quality manganese has been found near the U.S. camp site on Antarctica . . . A search is on for iron ore near Rock Springs, Wyo. . . . Reports persist that Canadian interests are considering a steel mill in the Montreal area; even Kaiser Steel Corp. is mentioned as a possible backer . . . A multimillion dollar industrial park, designed to accommodate up to 300 manufacturing plants, has been started on an 1800-acre tract in Florida's Palm Beach county . . . Treasury Secretary George M. Humphrey will become chairman of National Steel Corp. on July 1.

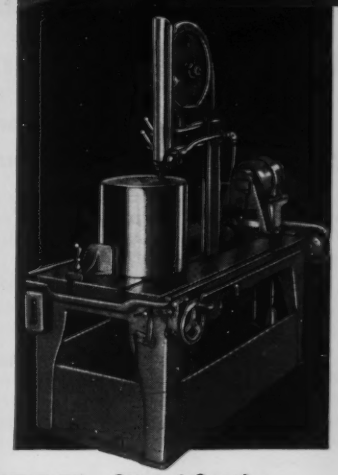
MARVEL NO. 8 BAND SAW makes a tough job EASY...

FLOOR TO FLOOR IN 5 HOURS... no special jigs, fixtures or set-up required

The versatility, simplicity of operation and unmatched efficiency of a MARVEL No. 8 Universal Metal Cutting Band Saw makes it the best all-around saw you can buy.

Take the job illustrated, as an example. Three equally spaced re-entrant cuts were required to segment a large, heavy die forging. The work was merely placed on the table between the vise jaws with the first lay-out line positioned to bisect the blade. Feed pressure was set on the direct-reading scale and the cut started. On a MARVEL No. 8, the work is always stationary and the blade is fed into the work; the cutting edge of the blade is always square with the table throughout its full feed traverse, which eliminates the need for special fixtures. The pre-set Automatic Overload-Relief Power Feed kept the blade moving into the work only as fast as it could freely remove the metal; as the vertical length of the cut decreased, the blade was automatically fed faster, thus increasing cutting speed. Upon completion of a cut, the blade was rapidly returned to its starting position by a rapid traverse handwheel located at the operator's position. Succeeding cuts were made in the same manner, with the same ease and speed.

Jobs like this aren't done every day, but they serve to emphasize the versatility of the MARVEL No. 8, a truly universal metal cutting saw. If you cut, machine or fabricate metal, this is a sawing machine you should know about. Write for catalog.



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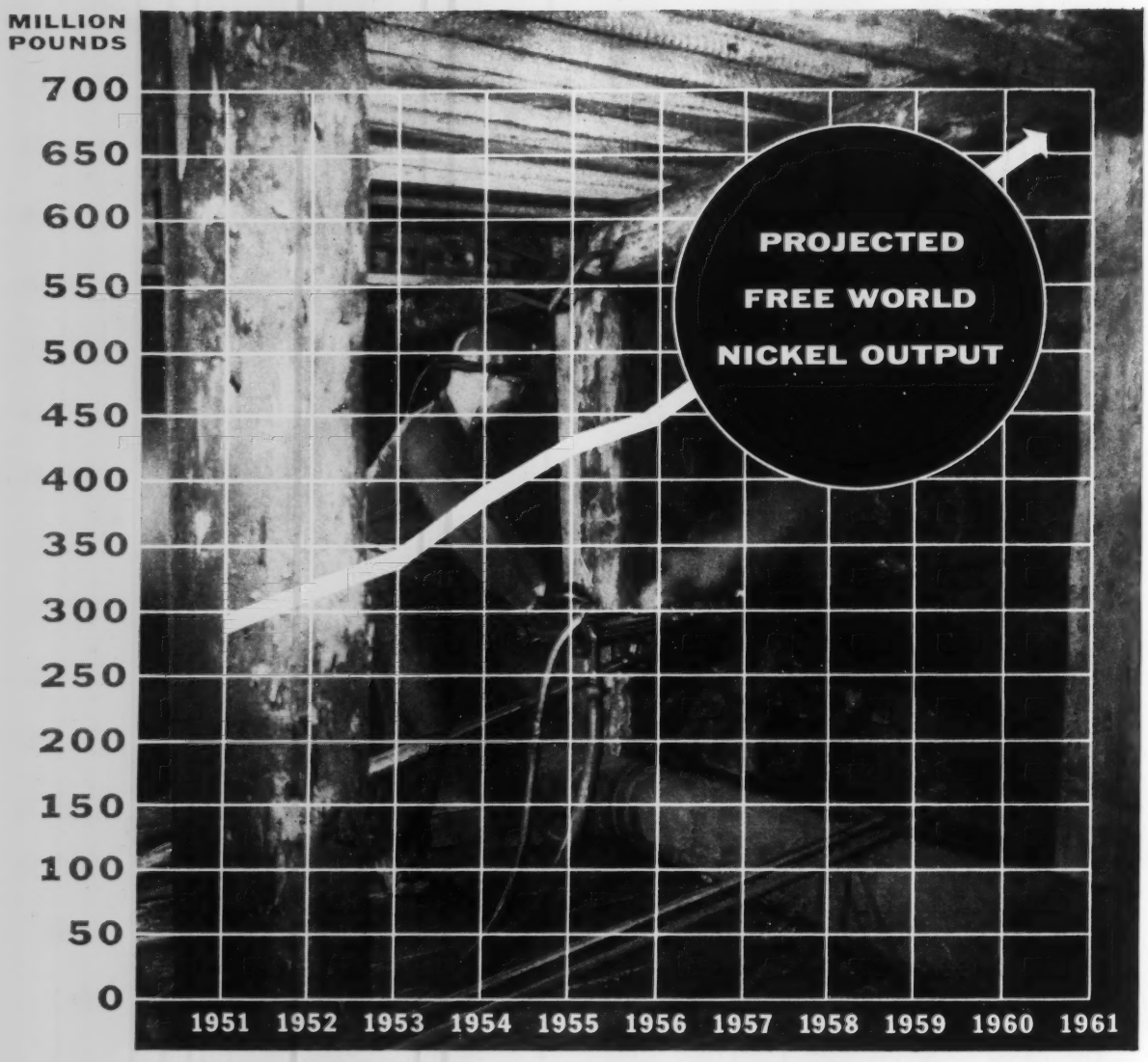
MARVEL Metal Cutting SAWS
Better Machines–Better Blades

S-1302



Another 50% advance in nickel industry's production capacity

Paced by Inco-Canada's new developments in Manitoba, producers put 1961 Free World nickel output at 650-675 million pounds a year—up 130% over 1951

In 1951, the nickel industry of the *Free World* produced about 290 million pounds of nickel.

Last year, the over-all output of the industry set a new record high of 450 million pounds.

This was an expansion of more than 50% in five years: a substantial production boost that indeed benefited industry, but only after vital defense and government stockpile needs were given preference.

New Inco-Canada developments help set new goals

Right now Inco-Canada, with years of exploration behind the project, is pushing construction at its new Manitoba mines: developing in the far North a new, big-tonnage nickel-producing area.

In Ontario, at the same time, Inco-Canada is continuing to expand its Sudbury capacity.

In 1961, this should lift Inco-Canada's nickel output to 385 million pounds a year. A hundred million more than in 1956!

With the steadily increasing capacity of all *Free World* producers, in the next four years nickel production should be lifted to the all-time high of 650-675 million pounds a year.

With 1961 capacity anticipated at more than twice what it was in 1951—and with continuing exploration—nickel users are assured of more nickel in their future.

The International Nickel Company, Inc., New York 5, N.Y.

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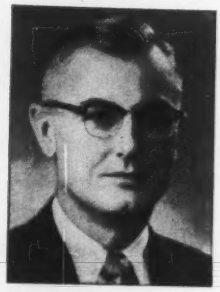
INCO **International Nickel**

The International Nickel Company, Inc., is the U. S. affiliate of The International Nickel Company of Canada, Limited (Inco-Canada)—producer of Inco Nickel, Copper, Cobalt, Iron Ore, Tellurium, Selenium and Platinum, Palladium and Other Precious Metals



Can We Spare ODM and BDSA?

We do not pretend to understand many things that transpire in Washington. Take the federal budget, for example. It's just too big and too complex for a layman to comprehend in detail.

Like most people, we think it could be reduced. That's an over-all impression, and, again like most people, we probably would be unhappy if the cuts resulted in reducing government services from which we personally benefit.

We are a little puzzled by the persistent and aggressive campaign to liquidate the Office of Defense Mobilization and the Business & Defense Services Administration. We are perturbed by reports from Washington (page 102) that the campaign may be successful.

On the President's behalf, the ODM has the responsibility to direct and coordinate all aspects of the nation's defense mobilization program. Specifically, it decrees what gets fast tax amortization; it decides the extent of stockpiling; it's responsible for ferreting out gaps in our mobilization base; it develops programs to keep industry and government continuing in case of attack; it plans stand-by economic controls. It is the connecting link with other agencies.

BDSA works with industry to carry out mobilization responsibilities. It contains many industry representatives who work without compensation. They keep the government advised on what their industries can do, and they keep industry advised on government mobilization plans. They represent an informed core of mobilization personnel should an emergency arise.

ODM's budget request for fiscal 1958 is $2.4 million. BDSA wants $7.1 million. Those figures appear modest compared with the $72 billion budget and the $45 billion for security spending.

As a budget cutting measure, we cannot understand why the mobilization agencies should be sacrificed—particularly while recommended appropriations for "study of the prehistoric living sites of Acheulian man in Central Tanganyika" remain in the budget.

Other arguments for abolishing ODM and BDSA are that they are under the influence of big business. Remembering how steel producers were turned down in their plea for fast tax amortization, we don't buy that charge.

Still another argument is that separate agencies are inefficient, that all mobilization planning should be centralized in the Defense department. As a matter of check and balance, we like some civilian influence in defense planning.

Those of us who watched or participated in the mobilization scramble at the beginning of World War II are likely to support both ODM and BDSA. With their preplanning, we could have done the job better, faster and cheaper.

Walter J Campbell

EDITOR

The threshold of better steel making

You'd be surprised at the number of Inland people, like these men, who spend their free time studying chemistry, metallurgy, physics—adding scientific knowledge to their already solid practical backgrounds. Inland's broad training plan, with a wide variety of formal and informal courses, covers just about every phase of the industry. Typical are the Inland-Purdue University cooperative classes in which men from our mills take college level courses in subjects related to steelmaking at Inland expense. Good investment, we find. For the results are bound to show up in better Inland service—better Inland steels—to meet *your* specific requirements.

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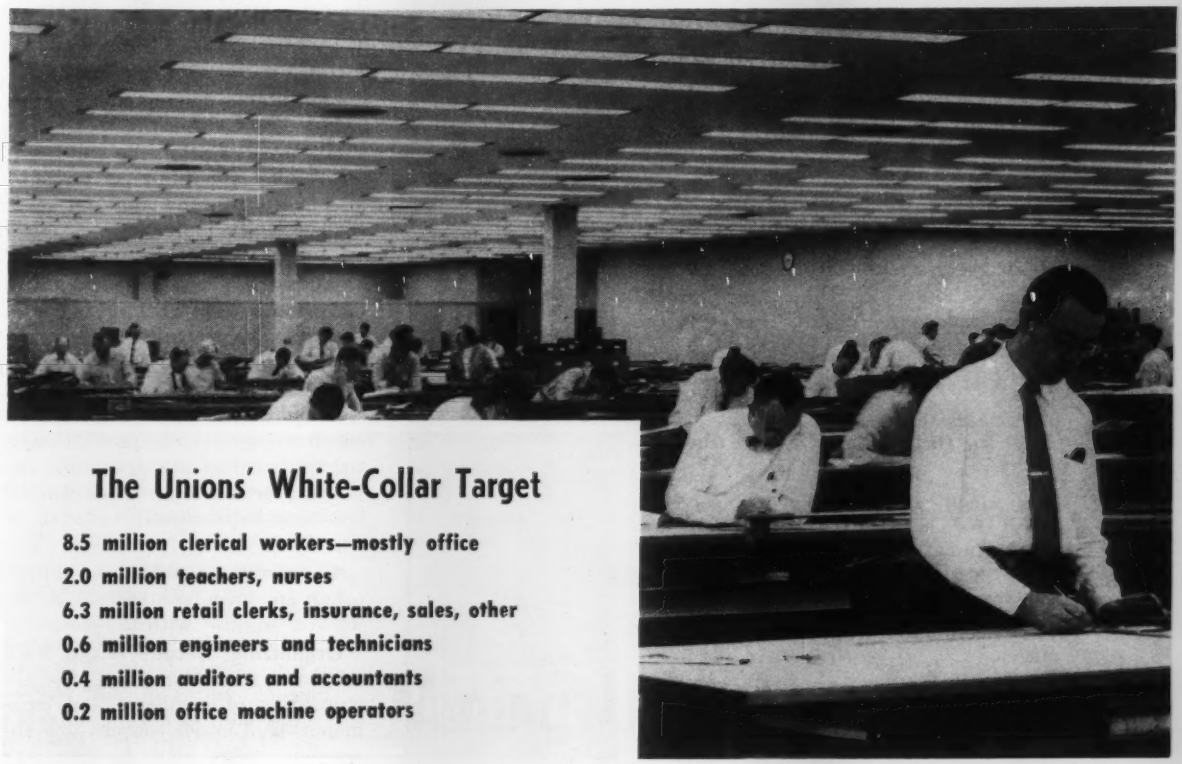


The Unions' White-Collar Target

8.5 million clerical workers—mostly office
2.0 million teachers, nurses
6.3 million retail clerks, insurance, sales, other
0.6 million engineers and technicians
0.4 million auditors and accountants
0.2 million office machine operators

White-Collar Drive Falters

ENGINEERS and technicians at Minneapolis - Honeywell Regulator Co. said "No" to the United Auto Workers. But management at Honeywell hasn't relaxed.

"We've got loose ends to wrap up so we can chart a new management course—this is the first time in ten years we haven't had a union," said a spokesman. What he had in mind: The company wants to make sure that its engineers and technicians will stay glad they turned the unions out.

Still Fighting—Industry hasn't relaxed either. Next month the American Federation of Technical Engineers, AFL-CIO, will launch a new drive for white-collar members. The Industrial Union Department of the AFL-CIO got under way in January. The United Steelworkers of America is getting up steam, too.

Labor's target is big: 18 million people. Not only are Jim, the shipping clerk, and Susie, the switchboard operator, being wooed, but your $700-a-month engineers and accountants are also prime prospects. (See the above breakdown.)

Necessity—Unions have to organize the white-collar group to maintain their status. The ratio of production to white-collar employees in industry is declining.

In the auto industry, the number of production workers declined 3.5 per cent, while white-collar employees increased 24.3 per cent from 1947 to 1956. In agricultural equipment, the production force dropped 25.2 per cent, compared with a white collar increase of 4.7 per cent in the same period. In aircraft, the ratio of production workers to white collarites dropped from 1 to 3.6 to 1 to 2.6.

How To Fight—Assuming that you don't want to be saddled with a union contract covering every nonsupervisory employee on your payroll, how can you counteract the movement? The Honeywell vote proved it can be done. (896 engineers voted for no union; 314 voted for the UAW; and 197 voted for the Engineers & Scientists of America which had represented them for ten years; 404 technicians voted for no union, 254 for the UAW and 62 for ESA.)

You can expect the first drives to be made in plants where the unions have already organized production workers and some white-collar people. The American Federation of Technical Engineers claims a 50 per cent membership increase since 1952—most of it

Will Your Engineers Organize When Approached?

Check Your Organizing Potential

	YES	NO
1. The difference between our starting salaries for engineers and the average salary of one with five years' experience is over $175.	___	___
2. We have adequate status, recognition factors . . .		
No time clocks for engineers.	___	___
Engineers have patent rights, or are paid for turning them over to the company.	___	___
As much as possible, engineers are used for engineering work. Adequate technicians and other service assistants are provided for nonengineering duties.	___	___
Engineers have leave of absence privileges.	___	___
Engineers have the same or equal fringe benefits that unionized production workers have.	___	___
We try to provide working conditions for the engineers which generate a "professional atmosphere."	___	___
3. Our engineers have an adequate grievance procedure.	___	___
4. We encourage—and help finance—engineers to further their education through night school, correspondence courses.	___	___
5. We have a fair merit review system. The individual discusses his progress with his supervisor at least once a year.	___	___
6. We encourage and help finance the participation of engineers in professional societies. We have a fair method of providing occasional attendance at conventions and meetings.	___	___
7. We train and instruct supervisors in good human relations.	___	___

How to score your potential:	Union's Organizing Chances
9 or more "yeses"	Remote
6 to 9 "yeses"	Slim, but possible
5 or less "yeses"	Good

coming from within companies already organized. Major companies involved included Radio Corp. of America, General Electric Co. and Bethlehem Steel Co.'s shipyards.

Union Points—Here are the basic strengths the unions are emphasizing:

1. They can offer the white-collar employee bargaining strength in a collective unit that he can't achieve as an individual.

2. Where production workers are organized, it's not too difficult to validate the claim that many fringe benefits the white-collar workers have come only after the union won them for the production workers.

3. Statistics can be developed which show that the pay differential white-collar employees once enjoyed over the blue-collar worker has been substantially reduced, or wiped out.

4. Unions can offer the white-collar employee contractual security and "rights" with the company.

Organizing Decade—Even with the results at Honeywell, the organization of engineers and technicians is of major concern to management. Most union headway has been made in the last ten years. About 8 per cent of the country's engineers and technicians are organized.

The American Federation of Technical Engineers claims 12,000 members—about equally divided among engineers and technicians. The largest group is the ESA, which claims 50,000 members, mostly engineers and scientists.

Attention Needed—STEEL polled a group of leading metalworking executives. Areas that they think require the most attention coincide with most of the points the unions are emphasizing:

1. Grievance procedures and individual's rights. This is one of the most important things, said one executive. Procedures and rights should be spelled out. The engineer as well as any individual must know that he is protected with some grievance procedure and right of redress. "In our company," said the executive, "an engineer cannot be discharged by his immediate superior alone. If the engineer has five years' experience or more, the president must approve a discharge."

2. Salaries. Starting pay for beginning engineers is high; unions contend the experienced engineer's pay has not kept pace. Says the ESA: In the 1930s, an engineer with 15 years' experience made four times as much as a beginning engineer; today, he makes only twice as much.

Most of the executive felt that salary schedules are not the most important factor in the organizing problem unless they are below average. Frank Endicott, placement director at Northwestern University, came up with these averages in a recent survey:

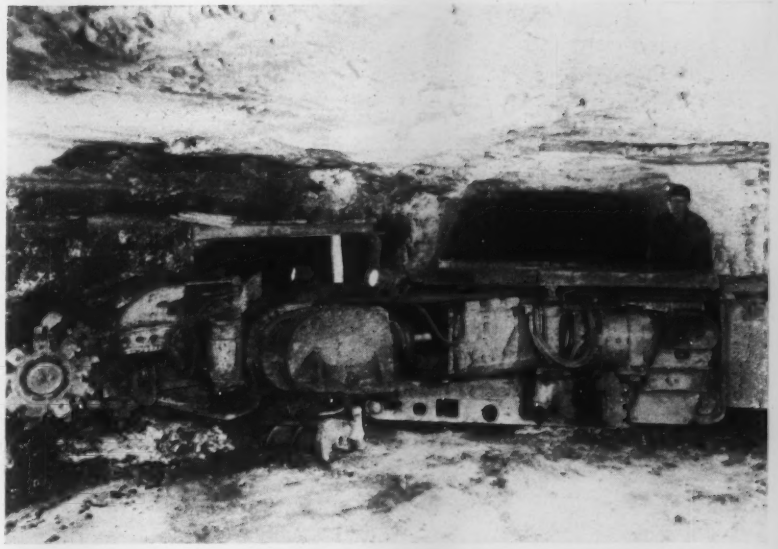
Engineers with three years' experience earn $527; after five years, $592; after seven years, $650. The figures represent averages from 94 companies in the first two categories and 88 companies in the seven-year category.

3. Merit rating programs, job descriptions. The ESA tries for contract provisions covering job descriptions to insure "that the engineer is assigned engineering duties — not blueprint chasing." Unions also press for the right to set up the criteria used in merit rating programs. Commented one Chicago executive: "Certain merit rating programs are worthwhile, but they must be management-initiated to be effective."

4. Overtime pay, patent rights. Here the unions are emphatic; standard overtime rates should be paid to all engineers regardless of salary level; individuals should keep the rights to patents they develop. Most executives feel that overtime payment does not pose too great a problem—engineers at the higher salary levels do not expect it; most at the lower levels are getting it. Some companies are abandoning the patent waiver they used to require. Along with some universities, they are paying patent royalties, or purchasing the patents outright from the individuals.

5. Membership in professional societies, educational grants, attendance at conventions. All are targets for union contract provisions. Most executives feel such programs, administered fairly, are worth the expense involved.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*



This continuous, mechanical coal miner digs 2 to 3 tons a minute

Mining Uses More Metals

INCREASED use of metals and mechanization was the underlying theme of the 1957 Coal Convention & Exposition of the American Mining Congress in Cleveland (May 13-16).

More than 250 firms (including steel, copper and aluminum producers and manufacturers of products made of those metals) had exhibits valued at $5 million. They were viewed by some 10,000 coal operators and executives from all over the U.S. and 24 West German coal mine officials.

Fading—The man with the pick is on the way out. Continuous mechanical miners that dig 2 to 3 tons of coal a minute were shown. Coal is belted from huge, revolving steel diggers to other conveyors or shuttle cars which take it outside and dump it into gondolas.

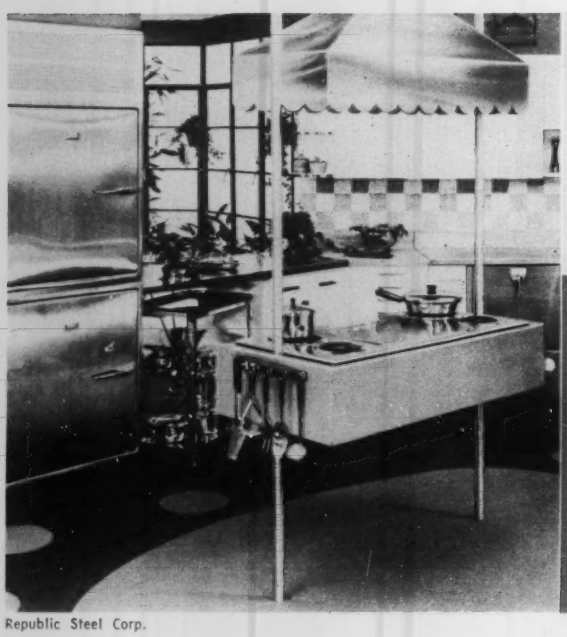
Some of the machines were so large that they could not be set up inside the exhibition hall. Metalworking products displayed included cables and wire rope, rails, trucks, cars, tractors, shovels, earthmovers, pipes, dryers, conveyors, steel roof supports and roofing bolts and all types of gasoline and electric motors.

Rebound—Mining officals say that the increase in production over the last two years is a result of millions of dollars spent by manufacturers in developing machines that will produce more at less cost.

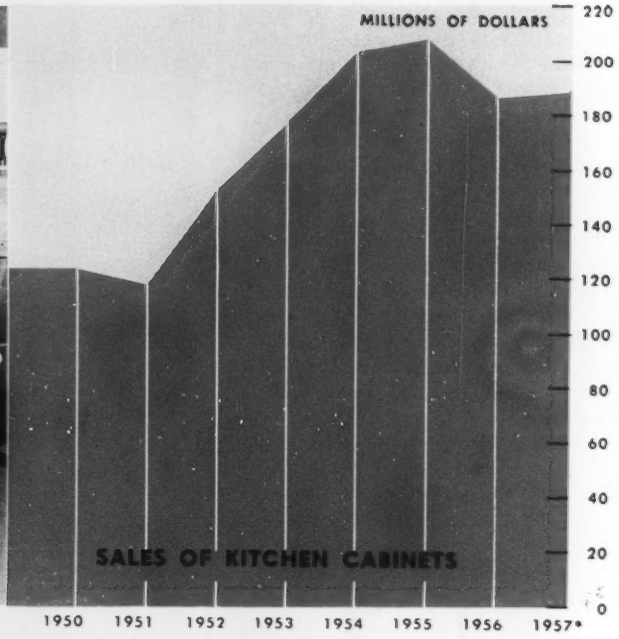
This year, for the first time, sessions were devoted to metal mining and the production of industrial minerals because of increased attendance of experts in those fields.

Tenor — Two separate sessions were devoted to continuous mining, indicating the importance mechanization is assuming in the industry. Technological problems were discussed, as well as those of maintenance, equipment and special roofing techniques required to keep up with the speed of the machines.

Safety—Special emphasis was placed on mine safety. Sessions covered fire hazards and prevention, accident prevention, personnel training and testing.



Republic Steel Corp.



Source: Steel Kitchen Cabinet Manufacturers Association.
*Estimated.

Steel Kitchens at '56 Pace

Any rise in housing starts will give industry a better year than last. Remodeling and modernization draw sales attention; more package deals offered

WHAT'S COOKING in steel kitchens?

Pretty much the same dish that other metalworking industries are brewing: Hot in some spots. Cold in others.

But industry-wide, 1957 is expected to be as good as 1956, if not slightly better. Last year, steel kitchen cabinet sales totaled $188.3 million, down 10 per cent from 1955's all-time record of $209.3 million.

Big If—"If building (new home construction) picks up, we will ride along with it," says Arthur J. Tuscany Jr., executive secretary-treasurer of the Steel Kitchen Cabinet Manufacturers Association. "If it stays down, some of our people may have some problems."

Sales for January and February were 15 per cent below those in November and December, Mr. Tuscany added, pointing out that traditionally the home building season starts about now.

Great Interest — A spokesman for American Radiator & Standard Sanitary Corp.'s Youngstown Kitchens Division, Warren, O., reports more interest from contractors than the company has ever experienced.

"If a majority of these commitments become firm orders," he said, "the last half of 1957 will be much better than the first half, and may be better than the second half of 1956."

Replacements — C. K. Reynolds Jr., steel kitchen sales manager of Republic Steel Corp.'s Berger Division, Canton, O., has this to say:

"While the general decline in new construction may affect steel kitchen sales to some extent, we are confident that our over-all kitchen cabinet volume will hold its own.

"For one thing, there seems to be a universal increase of interest in kitchen remodeling. That interest, stimulated for more than a decade through advertising and editorial features, is beginning to bear fruit now that many postwar homes—and the kitchens in them—are reaching the ten-year age bracket."

Package — With big appliance firms getting into the field today, there is a trend toward the "package kitchens": Range, sink (with waste disposal unit), dishwasher, refrigerator, deep freezer and sometimes a washing machine and dryer.

The custom units are offered in many pastel colors and arrangements. Ranch houses and other modern type homes, where the living area blends into the kitchen, call for new designs. So does competition within the industry and that offered by wood cabinets.

Join 'Em—Youngstown Kitchens has just introduced a new package kitchen called the Monterey which has hardwood doors on steel cabinets. "We feel that the doors

will sell more steel cabinets," said a spokesman.

About 80 per cent of the kitchen cabinets installed in new homes are made of wood. "But the vast majority are built on the job by a carpenter," says Mr. Tuscany.

Subcontracts—Many of the appliance companies have their cabinets made in toto by other firms to their designs. Smaller steel cabinet manufacturers, who do not produce appliances, make their own cabinets to be sold as separate, or grouped units.

The increased cost of steel and of labor has brought about slight increases in prices of steel kitchen components but mostly in the price of new items. "Competition keeps the price of established items fairly steady," says a Youngstown Kitchens spokesman.

Costs of constantly changing designs have hit the small manufacturer hard, Mr. Tuscany feels, and is an important reason for the trend toward merging with an appliance maker to produce a package kitchen.

Volume—Youngstown Kitchens, one of the largest producers, makes several package kitchens but directs most of its efforts at "the middle-class mass market which cannot afford custom built kitchens but wants to buy cabinet units separately. This market, chiefly remodeling and modernization, supplies most of our sales," said a spokesman.

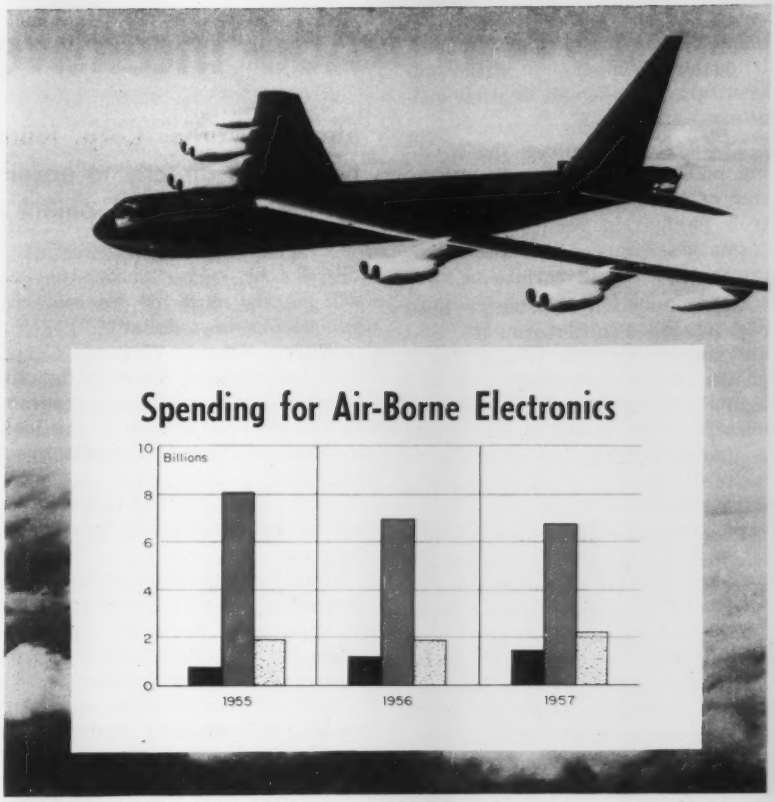
Ten firms produce about 85 per cent of the steel kitchen cabinets in the U.S., says Mr. Tuscany. Another ten smaller companies provide the remaining 15 per cent.

Distribution — Most producers have wholesale distributors throughout the country who stock various units. Some deal exclusively with one manufacturer; others wholesale related lines. Kitchen specialists account for more than 50 per cent of sales to the user. Other units are sold by appliance companies, department, plumbing and hardware stores.

National Acme Enlarges Office

National Acme Co., Cleveland, is modernizing and adding 9000 sq ft to its office facilities.

The project will be completed in October.



*Totals for aircraft and missiles include part of the funds shown in aviation electronics.

Electronics Flies High

NOWHERE is the spectacular growth of electronics more apparent than in its application to airplane building.

An airframe manufacturer estimates that from 1940 to 1945 electronic systems represented 11.5 per cent of the man-hours needed to build planes, 16 per cent of their cost and 2.5 per cent of their weight.

During 1950-1955, the systems accounted for 38 per cent of the man-hours, 48 per cent of the cost and 10.3 per cent of the weight, says the Aircraft Industries Association of America.

The over-all increase is reflected in the expenditure chart above.

Monitor—Today, nearly every job carried out by a man in flight operations can be done with electronics. As an era of completely automatic flight approaches, the pilot has less to operate and more to monitor. A World War II heavy bomber had 130 instruments and controls. A modern medium jet bomber has about 350 gages, dials and instruments—and only three crew members for the monitoring job.

The first mechanical fire control "system" consisted of a metal ring and a bead. Adequate for the slow planes of that era, it cost less than $5. An advanced system may cost $400,000 today. Its functions include complete automatic control through location of target, "locking on" and firing, maneuvering and landing.

Higher Costs—Bombing systems have followed a like pattern. The World War II bombsight, costing a few thousand dollars, gave the operator an optical view of the

target. Today's bombing-navigational system costs about $100,000. It enables bombers to strike unseen targets under all weather conditions.

The system stabilizes the bombing platform, computes the statistics of bomb release, tracks, controls navigation, secures radar information, translates it and determines altitude and variations.

Communication systems have also advanced in performance, cost and complexity. The World War II command set cost $600 and had eight preset channels. Today's model has 20 preset channels and a guard channel, in addition to manual selection of 1750 channels during flight.

Precision — Production requires machinery capable of nearly absolute perfection and conditions of positive temperature control. Some 2300 assemblies and 13,000 machined pieces make up the major assembly of a current bombing system. An error of 0.0001 in. in gearing could mean malfunctioning of the entire system.

As important to the industry as precise manufacturing is the discovery of methods. Fully 25 per cent of defense electronics manpower is assigned to research and development projects. The number of technical personnel needed to execute these programs has grown explosively in recent years. One major firm needed only 100 scientists and engineers in 1940. By 1946, it required 570; by 1950, 980; and by 1954, 1780. This year, it employs 2300—an increase of 2200 per cent in 15 years. And the end is not in sight.

Techalloy To Triple Shipments

Techalloy Co. Inc., Rahns, Pa., estimates it will double shipments this year and triple them in 1958 as the result of a $650,000 expansion program. The firm makes wire rods, ribbon and strip.

It has added a 24,000 sq-ft mill, containing equipment for fine-size drawing of Monel, nickel, Inconel, stainless and heat-resisting steels. Equipment for full production will include slitting machines, a 4-high reversing mill for strip up to 8½-in. wide and bright annealing strand furnaces using hydrogen.

Add Incentive to Research

Stewart-Warner Corp. found research can be sparked by tying costs directly to earnings. Divisional managers head up their own development programs

"HOW CAN we best insure that we will get the most for our research and development dollar?"

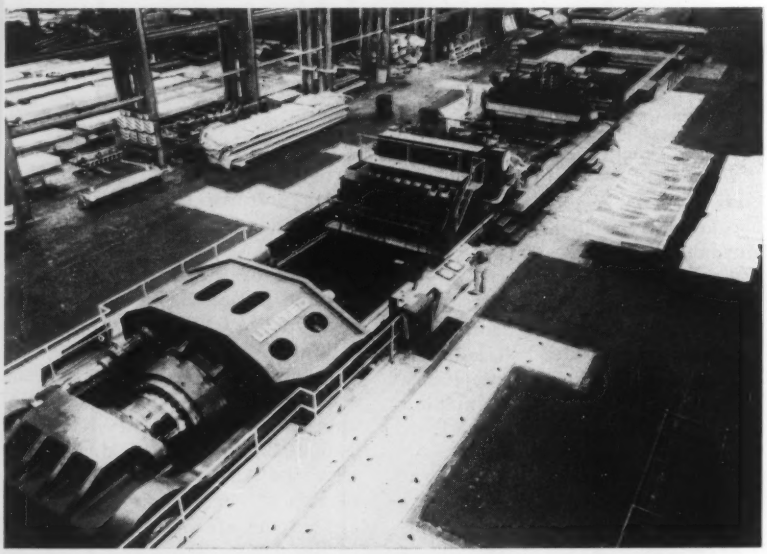
When Stewart-Warner Corp., Chicago, decided to step up its new product development program two years ago, it took a long look at that question. Officials knew they had to have clear-cut, well-defined objectives and methods before they could select productive projects.

Incentive — What they really sought was an effective incentive to continually spark the program. Their answer: Tie R and D expenditures directly to earnings.

S-W has nine divisions operating under a decentralized system. Each division is under the direct control of a general manager. He operates with a separate divisional profit and loss balance sheet. Key executives share in a bonus system based largely on their division's profits.

Budget—"First step in our program," relates Bennet Archambault, president, "was to set up a new product development budget. Of necessity, this was done somewhat arbitrarily, based on needs for new personnel; ability of the company to absorb new products into its manufacturing, sales and servicing groups; earnings outlook; and probable opportunities to select worthwhile projects. Percentagewise, we're now spending about 4 to 5 per cent of sales on new product development work."

Here is the tie-in between a division's earnings and its new product development expenditures: Each division is charged a definite percentage of sales for R and D work—whether it spends that much or not. There's no incentive for a division to hold back on research and development to bolster the profit side of the balance sheet. R and D charges are also included in



Big Stretch for Aluminum Airplane Wing Structures
This "stretcher" at the Reynolds Metals plant, McCook, Ill., can handle plates up to 6 in. thick, 90 ft long and 12 ft wide. Its 16-million-lb pull releases internal stresses in heat treated and rolled airplane wings

all formulas used to establish product selling prices.

As additional insurance for emphasis on new product development at the divisional level, all general managers act as chairmen of their new product development committees. Members of each committee must include heads of engineering, manufacturing and sales. The chairman is free to appoint others.

Liaison—To maintain close liaison between divisions and the overall company program, Stewart-Warner has three corporate R and D representatives who report directly to the president. Each division has one of these representatives as a member of its new product development committee.

Another requirement: New product development committees must meet regularly—at least once each six weeks. At four of these meetings—usually at the end of each quarter—the corporate representative is present.

Phases — Development work is authorized and conducted in planned phases: 1. Preliminary investigation. 2. Evaluation of technical and cost feasibility. 3. Development and testing.

Project authorizations costing $10,000 or under are jointly approved by division general managers and their corporate representative. Larger ones require approval by the president.

Detailed minutes of each division's new product development committee meetings are sent to all division general managers and the president. Minutes contain: Prospectus of each new project proposed, plus a technical and financial progress report on all projects under way. This procedure has three purposes, says Mr. Archambault:

1. It provides cross fertilization of ideas. 2. It adds a desirable element of divisional competition. 3. It eliminates the possibility of two divisions working on the same or similar projects (although sometimes that is desirable).

"The ultimate test of industrial research and development," believes President Archambault, "is on the profit and loss statement. Does the new product or process produce additional earnings? That's why we have set up our R and D organization in this manner."

Aircraft Industry: 1962

Air weapons production will drop to 2.5 million lb per month by 1962 as Defense shifts emphasis to nuclear devices. Prime contractors to keep more of work

BY 1962, the aircraft industry will bear little resemblance to what it is today. So predicts Maj. Gen. David H. Baker, procurement and production director, Air Materiel Command, U.S. Air Force.

The general says the trend to nuclear weapons will account for the change. He foresees a big reduction in manufacturing space and in the quantity of air weapons produced. (But the shift in emphasis is not interpreted to mean a proportionate drop in the dollar volume of the aircraft industry.)

Explanation — General Baker puts it this way: "The advent of the nuclear weapons, with terrible potential for havoc and annihilation, has sharply reduced the numerical requirements for strategic air weapons, compared with World War II requirements."

Trend — Defense needs for air weapons will hit a peak of 6.5 million lb per month early next year, then drop sharply, says General Baker. By 1962, at the latest, air weapons production will be down to 2.5 million lb per month.

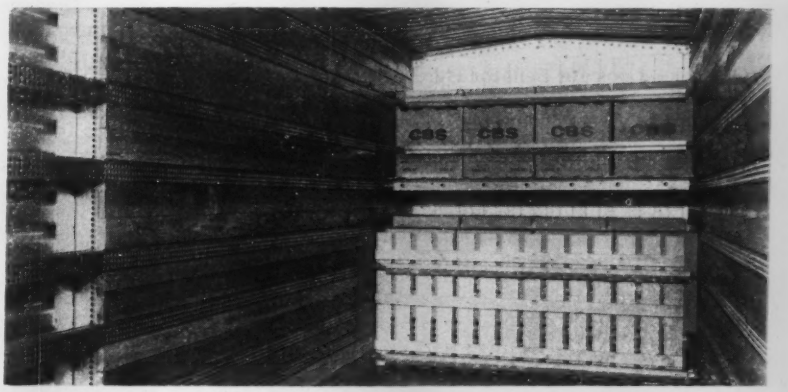
The reduction is explained by the general: ". . . the impact of missile technology is generated by the nature of the product. These weapons contain a much higher proportion of control systems in relation to total weight than do aircraft. They generally represent simpler frame construction and are smaller than the aircraft carrying the same destructive power . . ."

Present production is at a rate of 5 million lb of air weapons per month. At the peak of the Korean build-up it was 11 million lb.

Less Space—From 1959 to 1960, 20 million sq ft of manufacturing space will be utilized to meet aircraft and missile needs, compared with 40 million sq ft now used.

Some of the space we now have will be replaced by 10 million sq ft specifically designed for missile programs. But by 1960, says General Baker, the aircraft industry will have 50 million sq ft of idle space, compared with the 20 million sq ft now idle.

Another Factor—General Baker warns that while 30 per cent of the value of prime contracts is now passed to subcontractors, the situation will change as prime contractors decide to keep the work for themselves to justify their payrolls.



New Car Loading System Increases Dunnage Strength

Sparton Corp., Jackson, Mich., recently showed its "Tri-Belt," permanent dunnage, freight car loading system to railroad representatives in Chicago. Cross members, which can be anchored to the aluminum sides of the car, are rotated for greater strength. Sparton engineers claim that costs are lower and fewer cross members are used

Will Congress Give ODM Heave Ho?

PRESSURES to kill the Office of Defense Mobilization are starting to build up (see page 93). Says Rep. Charles A. Vanik (Dem., O.): "The office should be abolished and its functions placed in the Defense department on a stand-by basis." Don't be surprised to see more statements like that to come soon from other members of Congress.

Rumors—Since the first of the year, rumors have had it that either the Defense or Interior department (or both) were about to make a strong case for pulling ODM functions within their folds. Now, for varying reasons, legislators are talking in similar tones.

The biggest blow against ODM to date came from Treasury Secretary George Humphrey. He told the Senate Finance committee, headed by Sen. Harry Byrd (Dem., Va.), that fast tax write-offs to industry had cost the government $3 billion in interest charges on money it had to borrow to cover lost revenues.

Charge—Then Sen. George W. Malone (Rep., Nev.) charged that Defense Mobilizer Gordon Gray had entirely too much power for one man. He implied that Mr. Gray, or anyone in his position, could swing decisions to stockpile strategic materials or name companies to get write-offs.

Finally, Mr. Gray was able to object only mildly last week to Senator Byrd's bill to restrict tax write-offs to the procurement of "new" military weapons. Senator Byrd believes Congress could reinstate a full write-off program any time an emergency arises.

Outlook—Look for Senator Byrd's bill to pass. That, with the general easing in strategic materials' supplies, will be enough to start the ODM's decline.

Mark this up in the same class as the hassle over funds for Commerce department's Business & Defense Services Administration (STEEL, Apr. 22, p. 51). Barring a new emergency, both ODM and BDSA may be gone, or reduced to skeleton forces, after appropriation time next year.

Rebuttal—Defending ODM against Senator Byrd's bill, Mr. Gray reports these five fast tax goals will be closed "relatively soon": Facilities to produce nickel, steam turbines, steel castings, strategic mica substitutes and rollon-rolloff ships. That will leave three goals still operating. Two are catchalls for research and development laboratories and facilities for direct Defense department and Atomic Energy Commission procurement. The other, for liquid oxygen and liquid nitrogen, is reportedly about filled by applications, although all the certifications have not yet been made.

New Cabinet Replacements?

Commerce department's Business Advisory Council may have the inside dope on new cabinet appointees. They are betting they will be: Robert B. Anderson, Canadian mining holding company president, for Treasury's George Humphrey (who will go to National Steel Corp.); T. V. Houser, Sears, Roebuck & Co.'s chairman, for Commerce's Sinclair Weeks; and Donald Quarles, Defense's deputy secretary, for Defense's Charles Wilson.

If they are right about Mr. Quarles, look for a new admiral's revolt. He is on the Air Force's side in disagreements over the potential effectiveness of our super aircraft carriers.

Nickel "Shortage" Hit by Congress

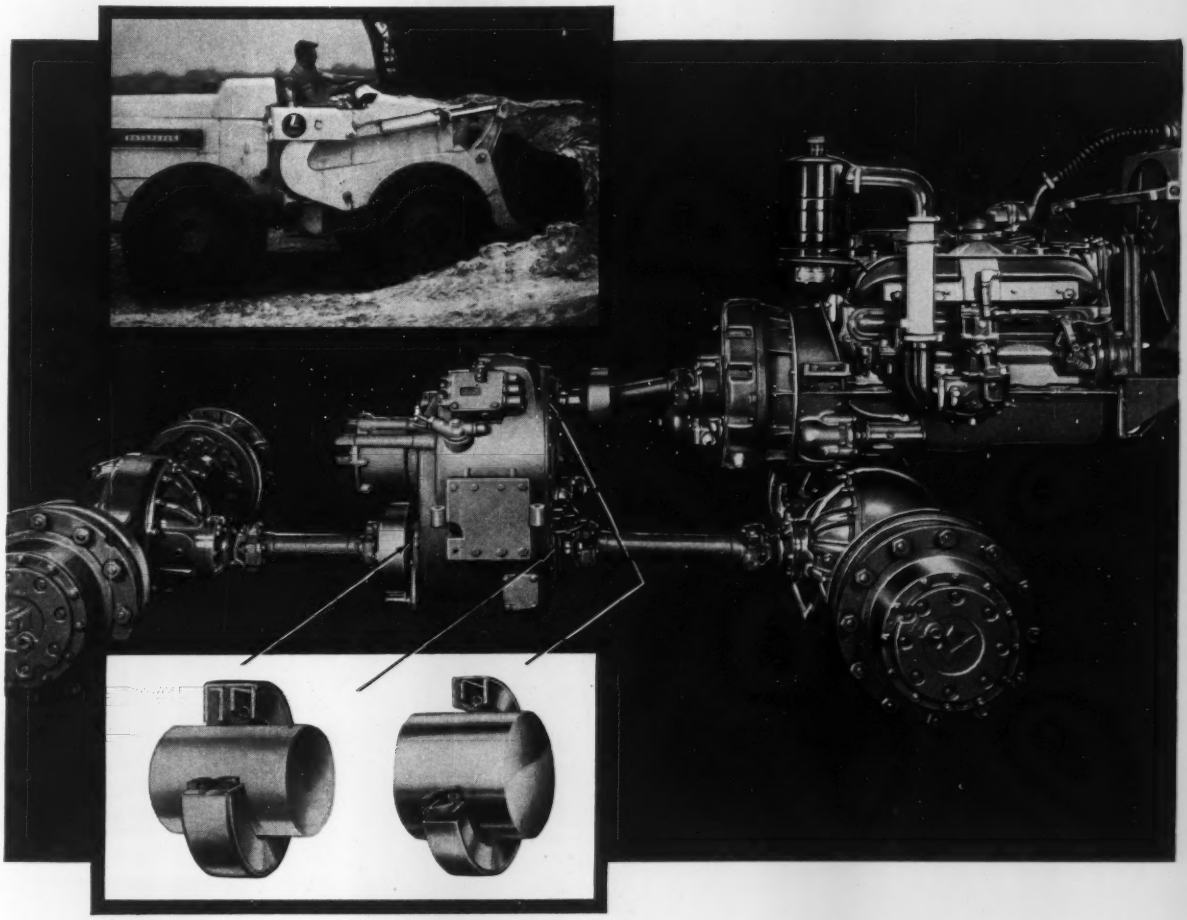
The Senate preparedness investigating subcommittee has issued a report criticizing the Defense department, Commerce department and Office of Defense Mobilization for not correctly estimating peacetime consumption of nickel and its increasing usage in military weapons. Six recommendations were made by the committee to ease the nickel "shortage."

But most of them have been kicked around for a year or more. What's unique about the report is its timing. In the last few weeks, these developments in the nickel picture have become known:

1. Defense Mobilizer Gordon Gray will probably close the nickel expansion goal under which fast tax write-offs are made. 2. No nickel will be called to the government stockpile for the balance of the year. (Diversions from stockpile deliveries will probably surpass last year's rate of 74 million lb.) 3. Nickel plating suppliers and job platers have been assured they will get an additional 1 million lb of nickel sinter and anodes per month from government sources for the next few months. 4. Steelmakers reportedly have nickel "running out their ears."

Meet Robert H. Merrill

He'll serve for the next six months as director of the Copper Division, Business & Defense Services Administration. Mr. Merrill is on leave from General Electric Co.'s Wire & Cable Department, Bridgeport, Conn., where he is manager of materials.



Keeps a workhorse working!

C/R lifeguards the power-shifted transmission in the big Hough "Payloader"

The new Hough Model HH "Payloader" is a big, tough tractor-shovel that wades through hard, rugged work day after day without flinching. Its power-shifted transmission makes it one of the fastest-maneuvering, easiest-handling tractor-shovels on rubber. To keep the transmission humming, two shafts must be protected: an input shaft turning up to 2,200 r.p.m., and an output shaft operating at speeds up to 3,000 r.p.m. All vital parts of the transmission are pressure-lubricated—the SAE 10 HD oil *must* be retained; dirt and grit *must* be excluded. C/R Type P and F Oil Seals with the Conpor K-400 sealing elements . . . specified by Hough engineers . . . have been performing with complete dependability well beyond the required 2,000-hour service life.

If you have similar problems involving lubricant retention or dirt exclusion, C/R Oil Seal engineers can help you. They'll select the correct seal for your application or gladly cooperate with you on special designs.

More automobiles, farm and industrial machines rely on C/R Oil Seals than on any similar sealing device.

OIL SEAL C/R DIVISION
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West Europe Closes Ranks

Euratom, Euromarket nations use Coal & Steel Community facilities; High Authority sees "transitional state" and "co-ordination of European communities"

WESTERN EUROPE has taken another step toward union. The six nations in Euratom and Euromarket (STEEL, Apr. 8, p. 69) will use the machinery of the European Coal & Steel Community (ECSC) to administer the two new communities.

"Little Europe" (France, West Germany, Italy, Belgium, the Netherlands and Luxembourg), decided to use ECSC's Common Assembly and Court of Justice to coordinate their common venture.

Optimistic—ECSC's High Authority said: "Existence of the new institutions (Euratom, Euromarket) side by side with the Coal & Steel Community is a transitional state of affairs out of which will gradually emerge the co-ordination of the European communities and their association with third countries, especially with Great Britain."

Britain has suggested that Euromarket be included in the free trade area of Britain and the commonwealths (STEEL, May 6, p. 57).

Report—The High Authority, in its fifth annual report, said: "With another ten months of the five-year transitional period still to run, the creation of Western Europe's common market in coal and steel is now almost complete."

The report continued that reorganization of the Belgian coal industry was the only major task that would not be completed in the next ten months. It has been held up by "boom conditions."

Steel Gains — Community steel production rose 36 per cent from 1952 to 1956, said the report, compared with a 25.7 per cent increase in Britain and a 23.4 per cent rise in the U.S. during the same period. USSR production rose 40.8 per cent during this period.

"The High Authority does not claim that this was due solely to the effects of the common market, but it has contributed by assuring a greater regularity in coal supplies, an increase in iron ore trade, the lowering of international transport costs and a common scrap import policy," the report said.

Rapid Rate—In 1956, basic steel production hit 66.4 million tons, compared with 57.8 million in 1955. The report termed this "a more rapid rate of expansion than the average world rate."

The community's share in world steel production had declined steadily from 1929 to 1951 (17.9 per cent) shortly before ECSC was formed. By 1956, its share had increased to 20.1 per cent, while those of the U.S. and Britain both dropped.

Exports Rise—Exports of steel to noncommunity countries rose 15 per cent between 1955 and 1956 to a total of 9.7 million tons. Coal production increased, but consumption rose faster, so that between 1952 and 1956 imports rose 65 per cent to 41.8 million tons, 80 per cent of which came from the U.S.

Long term objectives: Steel capacity of 115.5 million tons by 1975, with coal consumption up to 398.2 million tons.

More Foreign Autos

France asks motor car industry to export 60 per cent more in drive for credits

FRENCH auto makers have agreed to export 190,000 passenger units this year, an increase of 60 per cent over the number exported in 1956, provided the government finances shipping space.

This agreement was entered into at the request of the government in an effort to obtain more foreign currency for France. The Ministry of Economics says that other industries will be asked soon to follow suit.

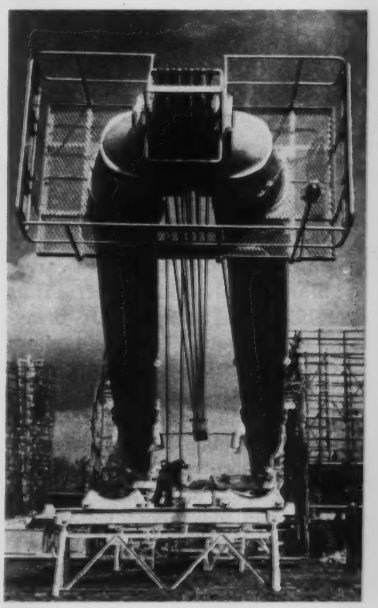
Impact — The industry, with 662,000 passenger cars last year, could not meet domestic demand. If the export goal is met, only 590,000 units will be offered at home. This means more delivery delay and an increase in used car prices. The government also plans soon to require 25 per cent down instead of 20 per cent now necessary to finance car purchases.

It is hoped that 780,000 passenger units will be produced this year. This would mean a total sales volume of $2.3 billion, original aim of the industry's modernization program to be completed by 1961.

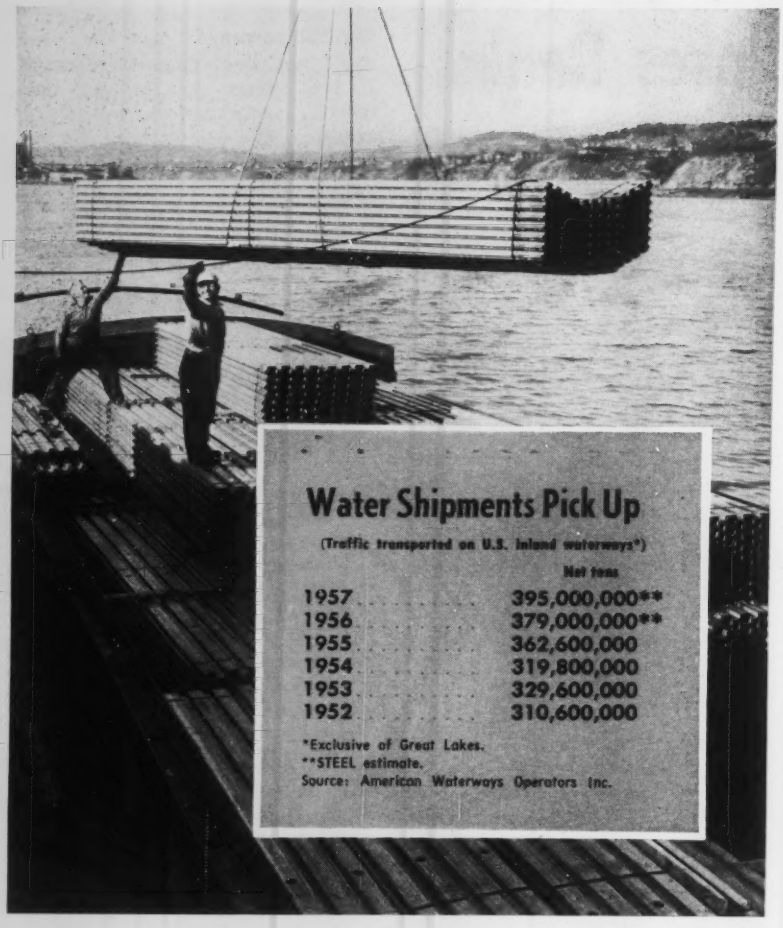
Form German Steel Combine

A huge steel combine is being formed in West Germany under the name of Rheinische Stahlwerke AG. It will include several coal mines, metalworking firms and producers of machinery, machine tools, ships, bridges and railway products.

Two steel firms, Ruhrstahl AG and Rheinisch-Westfalische Eisen und Stahlwerke AG, form the nucleus of the group which will have $90 million operating capital.



Going Up in a Hurry
This 120-ft drilling tower was put in place in less than 3 minutes at International Trade Fair in Hanover, Germany



Dravo Corp.

River Boat Renaissance

AMERICA'S 28,996 miles of navigable inland waterways are carrying more metalworking traffic than ever before. Shippers are bringing on a second "golden age" of river transportation, far greater than the first.

In 1955, 5.7 million tons of rolled and finished steel products and 2.9 million tons of semifinished steel, pig iron, scrap and iron ore were moved via inland waterways (exclusive of the Great Lakes). River statistics of the Corps of Engineers, U.S. Army, show 1954 shipments totaled 5.4 million tons of finished steel and 2.2 million tons of other iron and steel commodities.

Rush for Sites—River front sites are selling quickly as metalworkers vie with chemical plants, utilities and other industries for choice locations. American Waterways Operators Inc., Washington, lists 91 waterside locations selected by metalworking firms for new or expanded plants in 1956, not including 14 sites acquired by the aluminum industry.

Chester C. Thompson, AWO president, attributes growing demand for waterside locations to rising freight rates by competitive shipping methods, the unlimited supply of water, efficient handling of cargoes and economical electric power.

Metalworking firms picked locations on 11 rivers last year, but the bulk were on the Ohio and its tributaries, the Mississippi, the Gulf intracoastal waterway, and the Calumet-Sag channel in Chicago.

Tonnage — More than half the iron and steel traffic originates on the Ohio. The Corps of Engineers says Ohio river barge shipments of iron and steel products totaled a record 4.4 million tons in 1955, compared with 3.3 million tons in 1954 and 2.3 million tons in 1950. Shipments of all products on the Ohio added up to a record 71.5 million tons in 1955, far above 1950's 48.6 million tons. Total freight moved on the Mississippi river system was 163.8 million tons in 1955 and 114.7 million in 1950.

Pittsburgh area steel mills, supplying tubular products to southwestern petroleum industries, also rely on barges for as much as 10 per cent of their sheet, wire and bar shipments.

More Rivers—Representatives of Federal Barge Lines Inc., St. Louis, point out that steel shippers are ranging farther into the river system. Shipments on the Missouri were negligible before 1952. In 1955, towboats pushed 191,622 tons of steel up that river and 7298 tons downstream. Upriver shipments were mainly pipe and sheets from mills in the Chicago, St. Louis and Ohio river areas.

Shorter streams share in the prosperity. AWO reports that barges on 90 navigable miles of the Kanawha river in West Virginia moved products 385.1 million ton-miles in 1955, compared with 250.1 million in 1950.

Expansion — Steelmakers have optimistic plans for mills in the Ohio river valley. Producers on that river added 1.3 million ingot tons to capacity last year and will add at least 2 million tons under programs already announced.

U.S. Steel Corp. plans to add 670,000 tons to river front plants in the Pittsburgh area. Jones & Laughlin Steel Corp. is strengthening Aliquippa, Pa., capacity by 750,000 tons. Armco Steel Corp.'s Middletown, O., capacity increased by 434,000 tons in 1956. Plans announced by Wheeling Steel Corp., Weirton Steel Co. and Pittsburgh Steel Co. will add 580,000 tons to

the valley's steelmaking potential.

In other expansion plans, Detroit Steel Corp. is completing its $20 million enlargement program at Portsmouth, O., this year. Crucible Steel Co. of America is investing $12 million to improve its Midland, Pa., facilities.

Wanted: Barges — Demand for river vessels is heavy. Dravo Corp., Pittsburgh, built 112 barges and six towboats in 1955 and 106 barges and 13 towboats in 1956. Far from satisfying needs of inland waterway shippers with that output, Dravo's backlog of orders was 204 barges and five towboats at the start of 1957.

New industries need docks, too. Dravo has received ten requests for dock construction this year. Ormet Corp. awarded contracts to Dravo early this year for the construction of a ship dock and bulk material unloader at the company's new bauxite refining plant at Burnside, La.

Renaissance — Cities whose names bring memories of 19th century steamboat days are getting a new lease on life. Lee T. McCourt, chairman, Memphis, Tenn., Chamber of Commerce, reports: "In the last two years, the Memphis area welcomed 61 new manufacturing plants. Last year alone, 91 manufacturing firms and distributors expanded their plants."

Louisville's Chamber of Commerce reports that last year 15 firms announced plans to build plants, and 22 said they will expand. Some 13 companies in machinery or other metalworking fields plan to invest $13.5 million in factories.

In Cincinnati, plants built within the last five years by Ford Motor Co., General Electric Co. and Radio Corp. of America, employ 22,500 workers. Farther upriver, Wheeling, W. Va., reports that new or expanding plants will create 11,000 job opportunities in ten counties of the upper Ohio valley.

Bottlenecks—Not all areas share fully in the revival. Dwight Bedell, industrial commissioner, Chamber of Commerce of Kansas City, Mo., says: "Five metalworking companies have built in this area in the last five years, and 13 firms have expanded their plants. Although Missouri river traffic is increasing, we believe that Kansas City will not receive the full benefit of its river location until we have a 9-ft channel."

River users would like all channels to be 12 ft deep, but they are currently aiming at a standard of 9 ft. As recently as 1954, 48 per cent of the navigable rivers did not meet it.

The transportation bottlenecks aren't confined to channel depths. An Ohio steelmaker comments: "The lock system on the Ohio river is inadequate for the traffic. Delays at locks are frequent. Horsepower of towboats is being increased. Each tow carries more barges, causing more time to be wasted in going through locks. When waterways get the attention they deserve, you'll really see a renaissance on the rivers."

How Water Rates Compare*

(Minimum charges per ton of steel**)

BETWEEN PITTSBURGH AND ST. LOUIS

Water	Rail	Truck
$4.96	$16	$16

BETWEEN PITTSBURGH AND CINCINNATI

$2.25	$9.60	$8.40

*Does not include federal transportation taxes or transferral and unloading charges.
**Based on minimum of 1 million lb for water; 40,000 lb for rail; 32,000 lb for trucks.

River Transportation: Pros and Cons

ADVANTAGES

- Most economical.
- Quick pickups.
- Few delays en route.
- Good labor situation.
- Convenient for waterside plants.
- Efficient cargo handling.
- Accessible to major manufacturing and distribution centers.
- Good connecting lines with rail and truck.
- New river front terminals.

DISADVANTAGES

- Generally slower.
- Many inadequate locks and channels.
- Extra charges for shipping cargo from docks to consumer.
- High minimum shipments to qualify for lower rates.

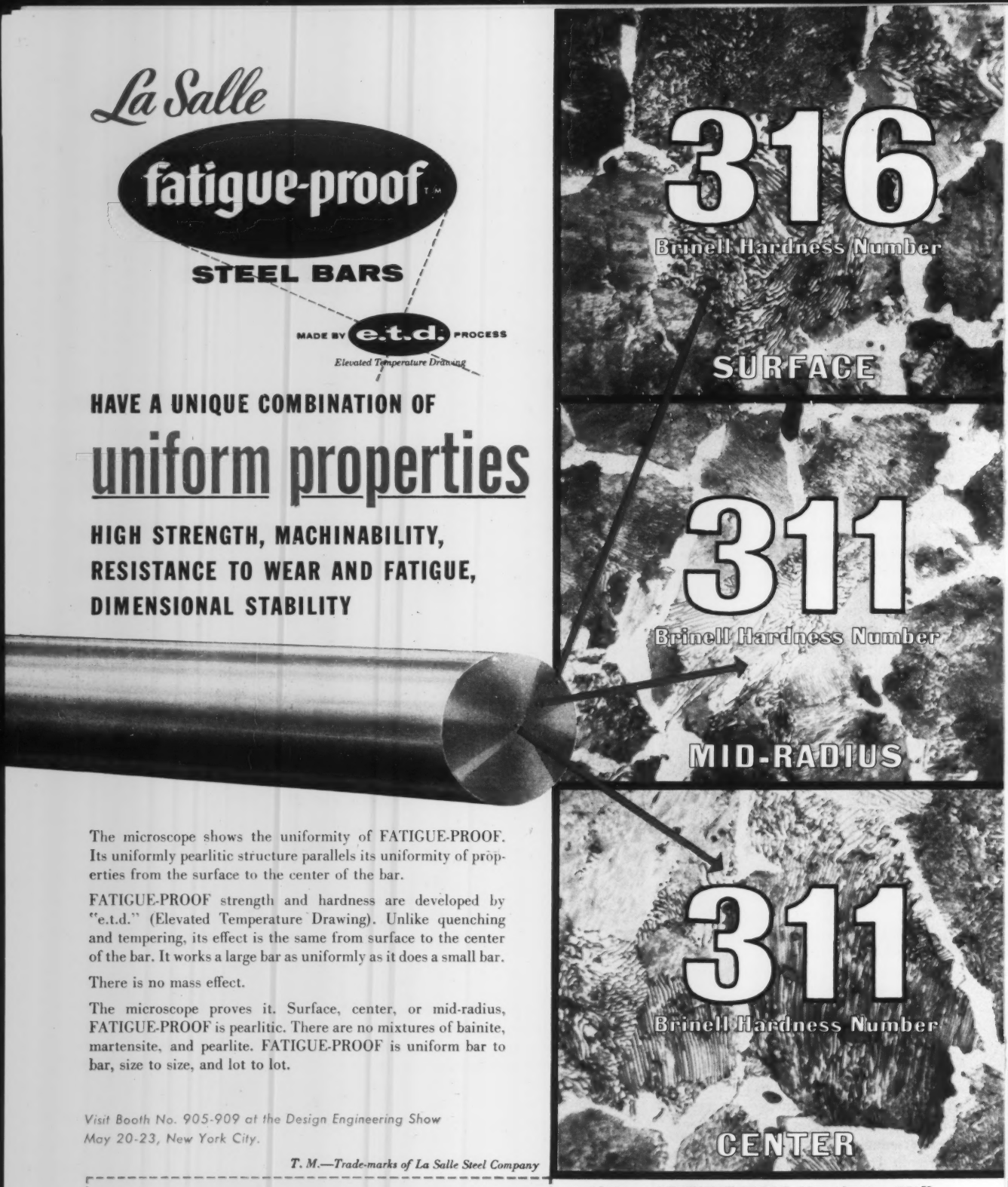
La Salle fatigue-proof™ STEEL BARS

MADE BY e.t.d. PROCESS
Elevated Temperature Drawing

HAVE A UNIQUE COMBINATION OF

uniform properties

HIGH STRENGTH, MACHINABILITY, RESISTANCE TO WEAR AND FATIGUE, DIMENSIONAL STABILITY



1⅜" round FATIGUE-PROOF. Magnification: 750X

The microscope shows the uniformity of FATIGUE-PROOF. Its uniformly pearlitic structure parallels its uniformity of properties from the surface to the center of the bar.

FATIGUE-PROOF strength and hardness are developed by "e.t.d." (Elevated Temperature Drawing). Unlike quenching and tempering, its effect is the same from surface to the center of the bar. It works a large bar as uniformly as it does a small bar.

There is no mass effect.

The microscope proves it. Surface, center, or mid-radius, FATIGUE-PROOF is pearlitic. There are no mixtures of bainite, martensite, and pearlite. FATIGUE-PROOF is uniform bar to bar, size to size, and lot to lot.

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JUST PUBLISHED—Request your copy of 24-page brochure, "A new material" . . . it tells the complete story of FATIGUE-PROOF.

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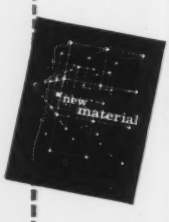

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Manufacturers of America's Most Complete Line of Quality Cold-Finished Steels Bars

Professional businessmen like Edsel's Krafve spark . . .

Autodom's Planned Growth

THE EDSEL Division of Ford Motor Co. typifies a change in thinking in Detroit: The planning of a specific car for a special market slot.

New Blood — Engineers and mechanics who built the first cars made up rules as they went along. Few of the pioneers are left. Their places are being taken by trained businessmen. Some of them hardly know a pinion gear from a tappet valve, but they're experts in corporate finance, management and marketing. They rely on engineers for technical know-how.

Perhaps the new philosophy is best summed up by Richard Krafve, Edsel general manager and Ford vice president, who says: "We believe automobiles are no different from any other business. The same general rules for making and marketing a product can apply."

Slow Trend—The effects of such an approach are only beginning to be felt in the industry. Edsel, in a sense, is a bellwether. It's the first car since the short lived Kaiser-Willys combine to be planned deliberately for a specific niche.

For this reason, the planning behind Edsel and some of the differences in its marketing are worth watching.

History—Following World War II, Ford reorganized to climb back to competitive levels. During this time, the company saw the medium priced car market boom.

"We wondered if we were prepared to get our share," remembers J. C. (Larry) Doyle, Edsel general sales and marketing manager.

"Market studies revealed that one out of four who owned a low priced car moved up to a medium priced job," he continues.

Although 26 per cent of these climbers went into Mercury, the competition was doing much better.

"It looked like we were growing prospects for our competition," Mr. Doyle adds.

Twofold—Now the trend not only is up, it is also sideways. Anyone who has bought a car recently knows a top line Ford, loaded with extras, costs $200 or $300 more than a stripped Mercury.

In this range, there has to be room for a buyer to spread out. Mr. Doyle says: "He may not like this year's Mercury, so we should have something else to offer, or he'll jump the fence."

Seeking—Studies on the possibility of another line of cars began in 1948 and 1949. They were shelved during the Korean War. In mid-1953, the program was stepped up, and a presentation was given to Ford's top management the following year.

In April, 1955, the company decided another line would be added. The Special Products Division was created that May.

Styling had started in 1954. "When we went to management, we wanted to show why another car was needed, and then say: 'Here's what we think will fill the bill.' " explains Mr. Doyle.

Studies — Meanwhile, Special Products researchers probed into what kinds of people bought medium priced cars and why they liked them. The studies were similar to those undertaken by

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other auto makers. The results were much the same.

But Edsel's biggest advantage has been that it can use these studies to plan a car that will hit what appears to be the most rapidly growing part of the market.

Other car builders have had to modify their products to meet market changes.

Approved—Events moved swiftly as research brought out fine points about what customers wanted. The final product was approved in the fall of 1955.

Last July, five regional offices were opened, and the division started recruiting and training 24 district managers.

In November, 1956, the Special Products Division dropped the curtain and formally became the Edsel Division. There's a lingering suspicion around Detroit that the name had been picked a year before.

Dealers—Three months ago, Mr. Doyle opened his district offices and completed staffing. The search for dealers was on. Right now, Edsel has what Mr. Krafve calls "4200 prospects, but no contracts."

The 1200 to 1400 dealers who initially will sell the four series of Edsels (18 models) will encounter some marketing ideas new to the industry.

Statements—"Dealers will have a simplified financial statement that can be used quickly as a management tool to make necessary changes. Most financial reports are so complicated it's too late to do anything by the time you've absorbed them," declares Mr. Doyle.

Counseling—All auto divisions have field representatives to help dealers in sales, advertising, service, accounting and other business angles. Edsel retains individual experts for distribution and service advice, but it's training management service representatives who can counsel dealers on all other phases of the business.

"These men are all-around business experts. They won't have any special axes to grind, and won't slight one part of a dealer's business for another," says Mr. Doyle.

Staff Function—Finally, the division has backed away from the usual line and staff organization in its sales setup. Regional managers are considered staff members with staff authority.

"Plans and programs go from the division directly to district offices and then to the dealers. Regional managers will not be issuing orders. They simply step in as staff representatives to counsel and help district men," explains Mr. Doyle.

Prospects — Edsel's marketing manager makes it pretty clear the division is aiming at the young medium-price prospect who is on the way up. Although Edsel doesn't specifically say so, it's commonly accepted that the models will bracket the Mercury line.

The accent on youth has given rise to rumors that Edsel will be a 400-hp sports car with everything but wings.

Rumors—Putting together the best of the "hot tips," one comes up with a car which may have these features:

Wheelbase of 123 in. Height is about 55 in. Front grille looks like a vertical oval sloping into an "A" shape. Rear quarter panels are scooped out halfway up.

The rear window area gives the reverse pillar effect now seen on Mercury's Turnpike Cruiser. The car is said to have a sleek, sporty appearance but is not classed with the Thunderbird or Corvette.

Unit body construction is not for Edsel this year, but some models are supposed to have a form of air suspension. Top horsepower will be around 350.

An improved braking system and pushbutton transmission also are supposed to be in the works. Introduction date is presumed to be mid-September.

Outlook—Mr. Krafve says Edsel will sell a minimum of 200,000 cars next year.

If it succeeds (and the division doesn't care for talk about the fate of Kaiser-Willys), Edsel will be the first car specifically designed to fill a marketing need.

U.S. Auto Output

Passenger Only

	1957	1956
January	642,089	612,078
February	571,098	555,596
March	578,826	575,260
April	549,239	547,617
4 Mo. Total	2,341,252	2,290,551
May		471,617
June		430,373
July		448,876
August		402,575
September		190,726
October		389,061
November		581,803
December		597,226
Total		5,802,808

Week Ended	1957	1956
Apr. 13	126,194	136,038
Apr. 20	118,327	129,826
Apr. 27	123,633	127,189
May 4	119,999	112,705
May 11	126,479†	105,552
May 18	125,000*	105,869

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

Exhaust Notes

• Ford will bring out an updated version of the Continental Mark II this fall. It will be called the Mark III. The division completed its 1957 model run (3000 cars) last week.

• American Motors Corp. cut automotive losses in the first six months of its fiscal year ended March 31. Losses were $5.3 million, compared with $7.9 million for the same period a year ago.

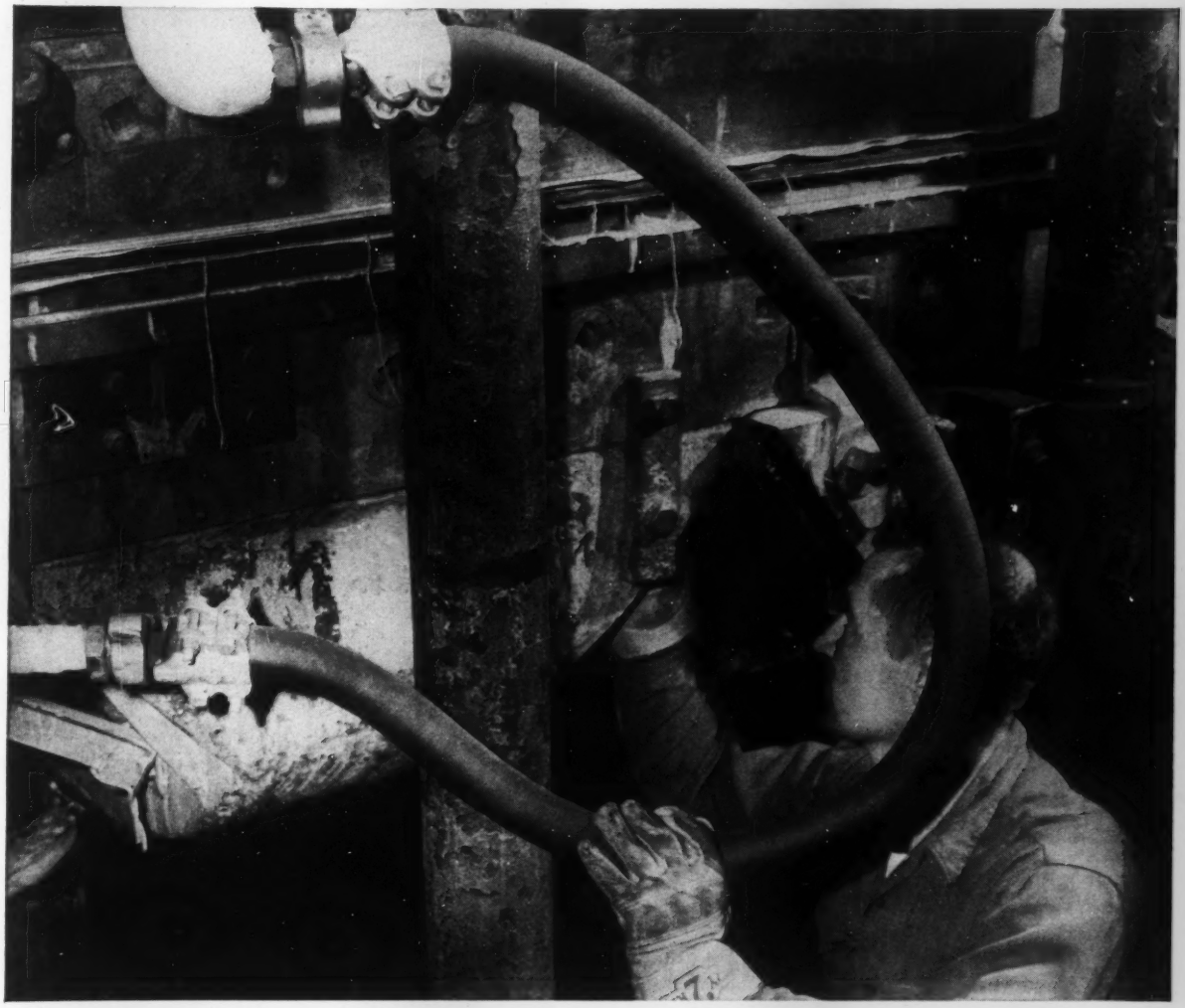
• Chrysler Corp. says white is favored over colors this year. Last year it was black.

• Ford's hourly and salaried employees earned $308.8 million in the first quarter of this year. This amount is second only to earnings of $325.6 million in the last quarter of 1956. The company has an average of 143,383 hourly workers.

• Dodge announces a pickup truck with 116-in. wheelbase and payload capacity of 1675 lb. Called the Sweptside 100, the truck will aim at the light vehicle market in an effort to wrest sales away from Ford's Ranchero, half car and half truck.

• Studebaker-Packard Corp. reports a net loss of $2.5 million in the first quarter of this year on sales of $58 million. This compares with a $14 million loss on sales of $107 million in the first quarter of 1956. H. E. Churchill, president, predicts the company will reach profitable operating rates by the end of this year.

MATCHLESS STEAM HOSE



How to stay alive working next to live steam

Steam—indispensable workhorse in an industrial plant. But if it breaks loose, steam may cause death on contact. Yet this man works with complete security—literally within an inch of his life—because he's working next to the hose that steam cannot burst: wire-braided U.S. Matchless® Steam.

This hose gives ample notice when replacement is needed. Even after long, hard service (and with 200 pound steam pressure) the safety-sure wire-braid construction of U.S. Matchless prevents it from bursting. Instead, just a wisp of steam is allowed to seep through. This acts as a safety device, telling you that replacement is needed. That's why plant safety councils all over the country find no match for U. S. Matchless.

Despite its great ruggedness, this hose is flexible, lightweight, easy to handle. U.S. Matchless steam hose—plus a complete line of industrial hose—is obtainable at any of the 28 "U.S." District Sales Offices, at selected distributors, or write us at Rockefeller Center, New York 20, N. Y. In Canada, Dominion Rubber Co., Ltd.

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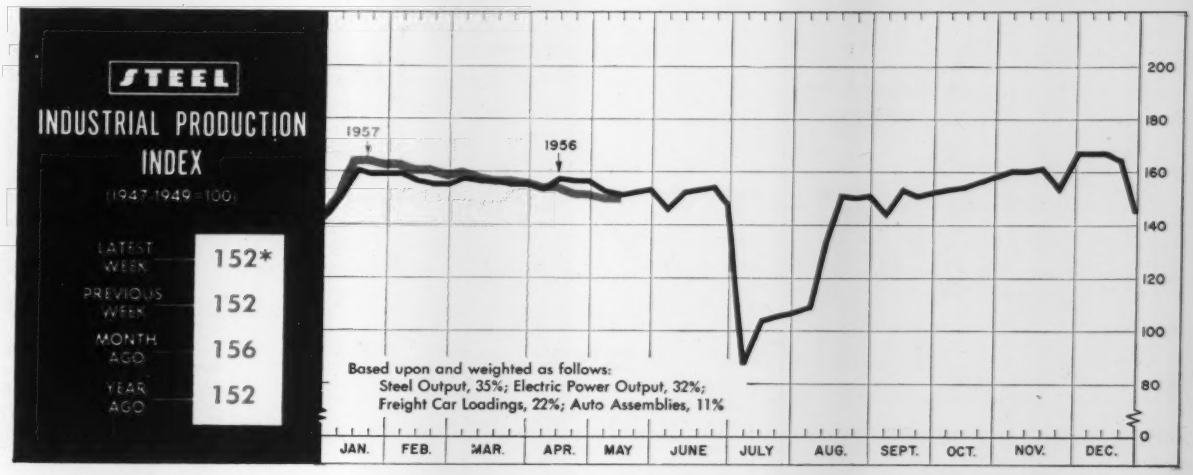
RB&W FASTENERS - *Strong Point of any assembly*



*Week ended May 11.

Future Looks Good as Dip Bottoms Out

THE CURRENT adjustment in the economy is nearly completed, and the trend should be upward during the third and fourth quarters. That is the consensus a panel of economic analysts presented to the Cleveland Society of Security Analysts a few days ago.

A High Low — The economists agree that the low point of the year will be this month or next. Their estimates: A reading of 140 to 144 on the Federal Reserve Board's industrial production index (1947-1949=100). The last time the index registered that low (with the exception of strikebound July, 1956) was in August, 1955—and it represented a record then. The present reading is around 144-145. One panelist predicted there will be little if any decline during the summer months, with a plateau followed by a mild rise after Labor Day. The uptrend will raise the FRB index to a record average of 150 by the first quarter of 1958, declares another. The consensus on that point is 148.

Two factors give this panel's forecasts a great deal of weight: 1. Its predictions have been amazingly accurate. 2. The panelists are all Clevelanders. It is widely recognized that the diversity of industry in northeastern Ohio makes the area particularly sensitive to national trends. The panel included: David C. Elliott, vice president, Cleveland Trust Co.; James M. Dawson, vice president, National City Bank of Cleveland; Russell H. Metzner, vice president, Central National Bank of Cleveland; and George R. Herzog, vice chairman, Union Commerce Bank.

Odds — The economists do not discount the possibility of a serious recession in the future. But, they agree that chances of a major recession within the next 20 years are less than even. Mr. Dawson points out that each dip since World War II has been less serious than the preceding one, until we have hardly noticed the most re-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,251[1]	2,220	2,345
Electric Power Distributed (million kw-hr)	11,250[1]	11,286	10,837
Bituminous Coal Output (1000 tons)	9,615[1]	10,000	9,826
Petroleum Production (daily avg—1000 bbl)	7,500[1]	7,529	7,029
Construction Volume (*ENR*—millions)	$385.2	$476.0	$557.7
Auto, Truck Output, U. S., Canada (*Ward's*)	160,743[1]	155,912	141,411
TRADE			
Freight Car Loadings (1000 cars)	715[1]	719	778
Business Failures (Dun & Bradstreet)	297	263	277
Currency in Circulation (millions)[3]	$30,589	$30,499	$30,296
Dept. Store Sales (changes from year ago)[3]	+7%	+3%	−7%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$22,434	$23,661	$20,658
Federal Gross Debt (billions)	$273.7	$274.0	$275.7
Bond Volume, NYSE (millions)	$19.9	$19.6	$22.3
Stocks Sales, NYSE (thousands of shares)	12,068	12,043	12,855
Loans and Investments (billions)[4]	$87.1	$86.7	$85.4
U. S. Govt. Obligations Held (billions)[4]	$26.0	$26.0	$27.4
PRICES			
STEEL's Finished Steel Price Index[5]	228.59	228.59	210.45
STEEL's Nonferrous Metal Price Index[6]	232.8	235.8	277.0
All Commodities[7]	117.2	117.1	113.9
Commodities Other Than Farm & Foods[7]	125.3	125.4	121.8

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1957, 2,559,490; 1956, 2,461,893. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

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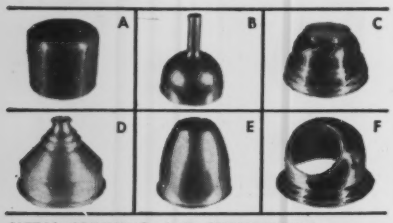

METAL SPINNING AND SPINFORMING:
Typical items: A—Aircraft detail; B—Handle lamp; C—Lamp shade; D—Lamp base; E—Electronic cover; F—Compass cover.

HYDROFORMING:
Typical items: G—Appliance cover; H—Jet engine detail; I—Aircraft detail; J—Jet engine detail; K—Cleaner cover; L—Motor housing.

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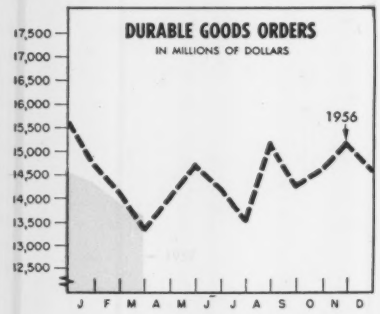
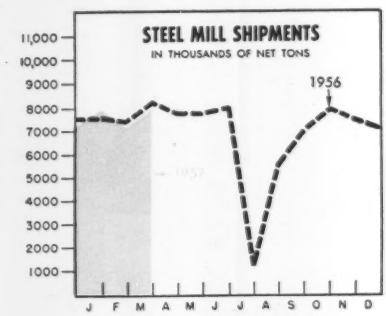
THE BUSINESS TREND



	New Orders* 1957	New Orders* 1956	Sales* 1957	Sales* 1956
Jan.	14,393	14,683	14,642	13,595
Feb.	13,979	14,107	14,726	13,593
Mar.	13,602†	13,337	14,470†	13,294
Apr.	.....	14,073	.....	13,519
May	.....	14,732	.....	13,754
June	.....	14,185	.....	13,850
July	.....	13,513	.....	12,627
Aug.	.....	15,166	.....	13,665
Sept.	.....	14,266	.....	13,692
Oct.	.....	14,591	.....	14,199
Nov.	.....	15,130	.....	14,321
Dec.	.....	14,544	.....	14,507

*Seasonally adjusted. †Preliminary.
U.S. Office of Business Economics.



	Net Tons 1957	Net Tons 1956	1955
Jan.	7,809,451	7,587,870	6,009,958
Feb.	7,066,732	7,468,293	6,119,900
Mar.	7,821,616	8,255,824	7,268,795
Apr.	.....	7,783,873	7,279,321
May	.....	7,764,776	7,540,889
June	.....	8,077,805	7,770,213
July	.....	1,288,988	6,250,597
Aug.	.....	5,539,915	7,053,615
Sept.	.....	7,058,028	7,378,247
Oct.	.....	7,930,957	7,216,821
Nov.	.....	7,431,136	7,247,994
Dec.	.....	7,064,093	7,580,943

American Iron & Steel Institute.

Charts copyright, 1957, STEEL.

cent inventory adjustment. He attributes this to a better knowledge and control of inventory conditions, plus the ever increasing purchasing power of the consumer. "Every day," he says, "100,000 families get a raise."

Mr. Herzog feels that chances are 60-40 that this "chronic prosperity" is here over the long term. Mr. Metzner believes that as long as our monetary policies don't get out of hand, the economy will progress. He credits Federal Reserve policies for keeping things under control during the last few months. Mr. Elliott bases his forecast on the spending approach. Both government and consumer spending are still advancing, and capital expenditures (the most important clue to the future, he thinks) are still strong.

Hand in Hand—If spending does advance throughout the rest of the year, it would seem that improved production is assured. The panel believes that inventories are nearly balanced and that production will be paired with sales from here on.

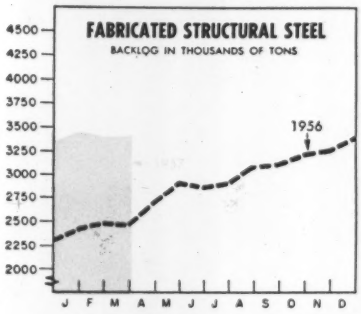
STEEL's Index Firms Up

STEEL's industrial production index has just about hit its low point at an estimated 152 per cent of the 1947-1949 average. Chances for improvement are the best in weeks.

The buoyant factors over the next few weeks will be electric energy output and freight car loadings. Auto production will probably hold steady for another couple of weeks, and steel production may continue its gradual decline through May.

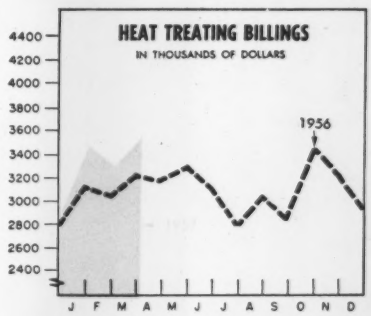
Although the consumption of electricity has been ahead of year-ago figures, the advantage has been shrinking in the last few weeks. This is probably the result of longer daylight hours and reduced demands from industry. There should be an increase in Edison Electric Institute's weekly figures as the weather warms up and more air conditioners are turned on. At the height of the season, this could add from 4 to 6 points to the index.

Freight car loadings are still lagging behind comparative 1956 totals, but they are gaining strength. A glance at ore boat activity at almost any Great Lakes port gives assurance that a hefty boost in ore and coal loadings is in prospect. If factory production responds to consumer purchases as indicated above, this should also be a plus for car loadings.



	Shipments 1957	Shipments 1956	Backlogs 1957	Backlogs 1956
Jan.	262.2	251.5	3,476	2,408
Feb.	278.5	285.4	3,436	2,476
Mar.	305.0	306.8	3,454	2,463
Apr.	....	289.6	....	2,687
May	....	306.2	....	2,896
June	....	284.7	....	2,859
July	....	165.5	....	2,904
Aug.	....	213.5	....	3,076
Sept.	....	240.9	....	3,108
Oct.	....	287.6	....	3,215
Nov.	....	276.0	....	3,252
Dec.	....	297.8	....	3,373
Total	....	3,205.5		

American Institute of Steel Construction.



	1957	1956	1955
Jan.	3,494.7	3,116.4	2,181.0
Feb.	3,337.9	3,124.8	2,184.5
Mar.	3,571.6	3,330.9	2,599.5
Apr.	.....	3,172.0	2,579.5
May	.....	3,292.3	2,644.4
June	.....	3,094.5	2,645.1
July	.....	2,762.5	2,180.0
Aug.	.....	3,040.7	2,535.6
Sept.	.....	2,832.9	2,666.8
Oct.	.....	3,442.3	2,897.2
Nov.	.....	3,205.7	2,935.7
Dec.	.....	2,931.2	2,891.1

Metal Treating Institute.

These factors will go a long way in counteracting the summer declines in steelmaking and auto production. This leaves the outlook for the index at steady to rising over the summer months.

Orders, Sales Decline

On the bearish side is the decline in manufacturing sales, orders and backlogs reported by the Department of Commerce for March. While both sales and orders advanced on an absolute basis, the increases were not as great as seasonal factors indicate they should have been. (See chart and table, page 114.) However, even the adjusted figures were well ahead of March, 1956, totals. A large part of this year's declines was accounted for by durable goods industries.

The fact that backlogs are slipping a bit doesn't seem to have businessmen worried too much. Reports like these assure good production well into the future: Bucyrus-Erie Co., up 15 per cent; National Acme Co., sufficient backlogs to carry it through September; Jack & Heintz Inc., $22 million, a rise of $3 million over the last 60 days; Allis-Chalmers Mfg. Co., $250 million (excluding the tractor group), an all-peacetime high.

Total Employment Climbs

Employment figures continue to supply a potent source of optimism. Department of Commerce reports that employment increased by 400,000 in April to a total of 64.3 million, exceeding the April record of just under 64 million which was set last year. At the same time, unemployment declined 200,000 to 2.7 million. Both movements were seasonal. Nonfarm employment rose by 260,000 to set an April record of 51.6 million.

Secretary of Labor James P. Mitchell says: "Continued economic strength, coupled with seasonal expansion in agriculture, construction and other seasonal industries, should push the national job total to all-time highs this year . . . It should approach or exceed 68 million at the midsummer peak." This compares with STEEL's estimate of 67.5 million (Apr. 22, p. 63). This will include about 2 million high school graduates and students who will seek full-time or summer employment next month.

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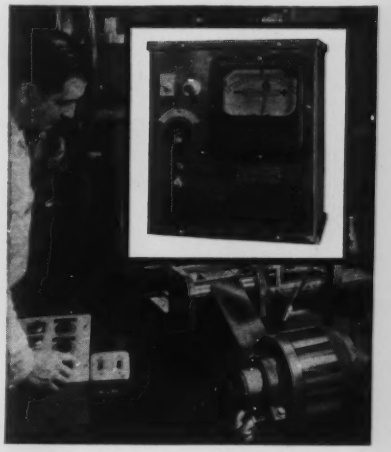

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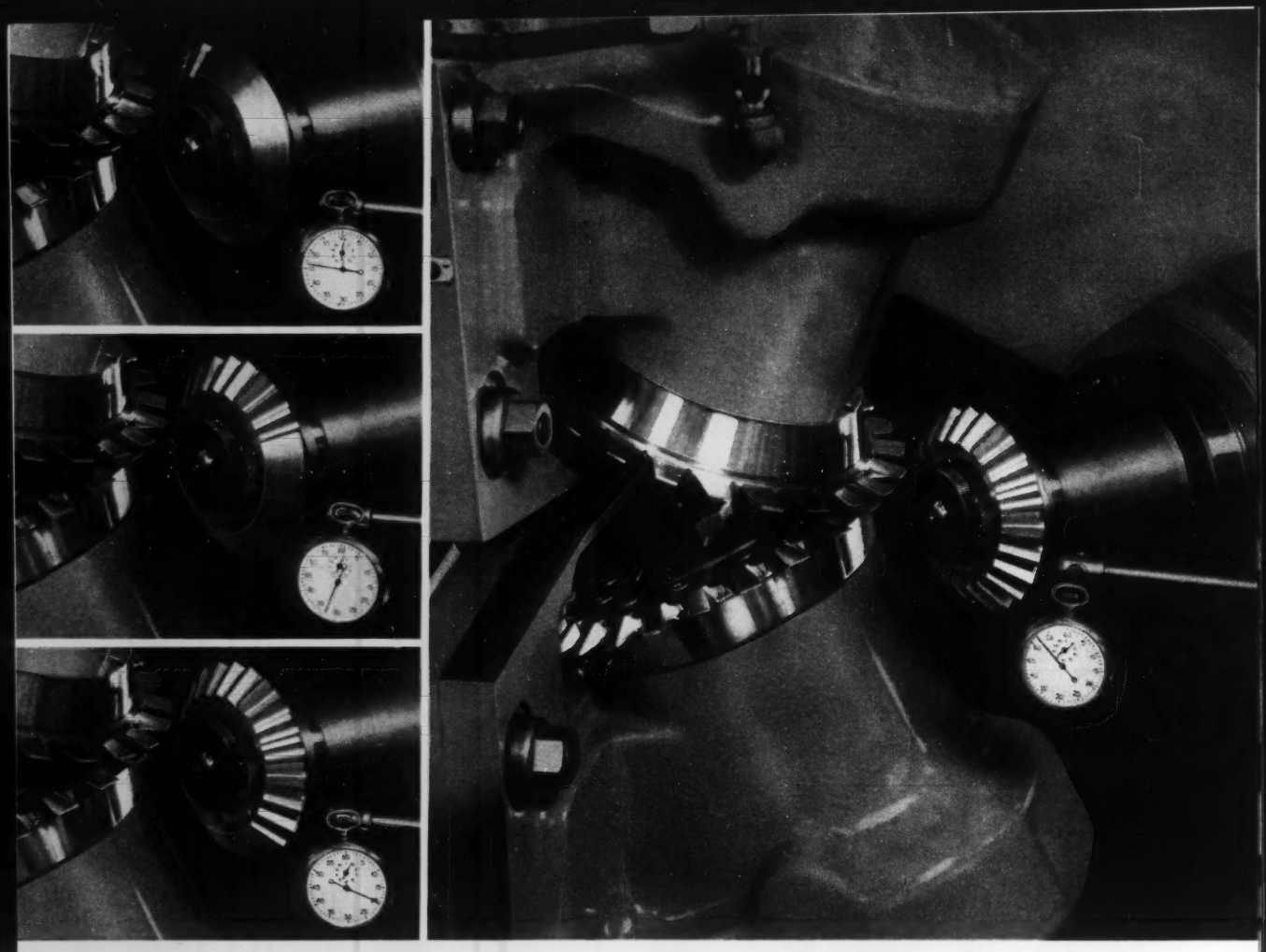

3 minutes-52 seconds, completed from the solid

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Your exact gain may vary with different gears, but in most cases this new generator will complete five gears in the time earlier models cut just one. The illustrations above show a 6 DP, 25 tooth, 7/8" face width, straight bevel gear completed from the solid blank.

The No. 104 Straight Bevel Coniflex* Generator completes each tooth in one rapid operation. A pair of multi-blade disc-type cutters combined with a cam-controlled machine cycle insures high efficiency, fine finish and maximum cutter life.

Easy to set up, the No. 104 has a wide range of capacity. You'll get the same excellent results for both small quantity jobbing work and volume production.

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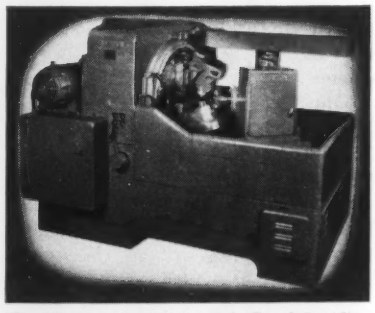
*Coniflex® straight bevel gears with localized tooth bearings.



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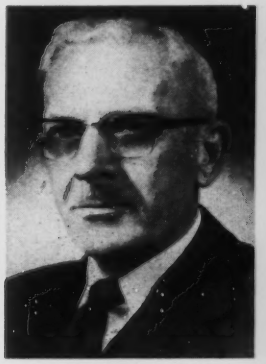

GEORGE H. ACKER
Cleveland Worm & Gear pres.

Robert F. Lane was elected executive vice president, **Fischer & Porter Co.**, Hatboro, Pa. He was assistant to the president.

Louis E. Newman was elected president of **A. L. Smith Iron Co.**, Chelsea, Mass. He succeeds **Julian J. Smith**, now chairman and treasurer. Mr. Newman was general manager of insulating materials at General Electric Co.

Duane M. Mayhew was elected vice president-sales, **Victoreen Instrument Co.**, Cleveland. He was general sales manager for the radiation instruments and electronic components divisions.

Baboo Ram Teree was elected vice president in charge of engineering and manufacturing of **Greer Hydraulics Inc.**, Jamaica, N. Y. He was chief engineer and manager of engineering and manufacturing.

E. T. Gruendike was elected vice president-production, **General Railway Signal Co.**, Rochester, N. Y.

C. G. Hussey & Co. Division, Copper Range Co., Pittsburgh, elected **J. R. Lally, J. S. Leonard** and **J. G. McNeely** vice presidents.

George P. F. Smith was named a vice president of **Borg-Warner Corp.**, Chicago. Former assistant to the chairman, he was in charge of the New York office, the position he now holds. **Robert W. Murphy**, vice president and general counsel, succeeds **G. A. Shallberg Sr.**, retired, as chairman of the executive committee.

Stanley de J. Osborne was elected president, **Olin Mathieson Chemical Corp.**, New York. He succeeds **Thomas S. Nichols**, now chairman. **John M. Olin**, former board chairman, becomes chairman of the financial and operating policy committee and continues as chairman of the executive committee.

Dan T. Warner was elected president, **Master Electric Co.**, Dayton, O. He was executive vice president.

George F. Crosby Jr. was made manufacturing manager, **Robins Conveyors Division**, Hewitt-Robins Inc., at Passaic, N.J. He succeeds **Edward J. Mytkowicz**, now manager of operations at the Jones Machinery Division, Chicago.

William P. Snyder III was elected president of the associated **Shenango Furnace Co.**, Pittsburgh. Former senior vice president, he succeeds his father, **William P. Snyder Jr.**, now chairman. **John K. Foster** was named senior vice president.

Joseph H. Cannon was elected chairman and president, **Clifford-Jacobs Forging Co.**, Champaign, Ill. He also serves as general manager. **F. H. Bachman** was elected executive vice president, continuing as secretary-treasurer. **Herman Lewis** was elected vice president.

Woodruff & Edwards Inc., Elgin, Ill., elected **Orval Graening** vice president-foundry division; **Howard F. Lewis**, vice president - general sales manager; **Carl O. Tolf Jr.**, vice president, Wade Division.

George H. Acker was elected president and **Howard Dingle** chairman of **Cleveland Worm & Gear Co.** and its affiliate, **Farval Corp.**, Cleveland. Mr. Acker was executive vice president. Mr. Dingle was president.

Julius C. Hydrick was made assistant general manager, **Riverside-Alloy Metal Division**, H. K. Porter Company Inc., at Riverside, N.Y. He formerly held the position of works manager at two other Porter divisions—Quaker Rubber and Delta-Star Electric.

Lee Rubber & Tire Corp.'s **Republic Rubber Division**, Youngstown, named **Ralph W. Deemer** factory manager; **J. P. Mathews**, manager of development and research.

Walter L. Robinson was made quality control manager for **Pheoll Mfg. Co.**, Chicago.

I. D. Sims was made assistant vice president - purchasing, **Bethlehem Steel Corp.**, Bethlehem, Pa.

Otto A. Pfaff was elected chairman of **Wheelabrator Corp.**, Mishawaka, Ind., to succeed **Verne E. Minich**, founder of the company, who becomes honorary chairman. Mr. Pfaff continues as president.

William L. Litle was elected chairman and president, **Bucyrus-Erie Co.**, South Milwaukee, Wis. President since 1952, he succeeds **William W. Coleman** as chairman. Mr. Coleman was named honorary chairman. **Lyle S. Cline** was elected vice president-secretary; **David W.**

VINCENT Q. RAPP

DANA B. GRIFFIN

Van Products appointments

JOHN N. MILLER

HARRY K. TAYLOR

Jessop Steel operations posts

Harris, vice president. **Albert S. Puelicher** succeeds Mr. Coleman as chairman of the executive committee.

Van Products Co., Erie, Pa., appointed **Vincent Q. Rapp** general manager; **Dana B. Griffin,** sales manager.

Hiram B. Young was made vice president; **F. Leonard Bryant,** vice president-production, **Hooker Electrochemical Co.,** Niagara Falls, N. Y. Mr. Young was vice president in charge of eastern production. He now assumes broader responsibilities.

Clarence M. Stevens was named manager of manufacturing for **General Electric Co.'s** industrial heating department at Shelbyville, Ind. He succeeds **Karl D. Kirk,** who was named to the manufacturing staff of the medium ac motor and generator department at Schenectady, N. Y.

William L. Wallace was made assistant to the executive vice president of **Alloy Precision Castings Co.,** Cleveland. Before joining the firm last March, he was styling administration manager for Ford Motor Co.

J. Y. McCandless was named district sales manager at Syracuse, N.Y., for **Babcock & Wilcox Co.'s** tubular products division.

Clarence H. LeVee was appointed director of engineering, research and development for **Hubbard & Co.,** Pittsburgh. These men will supervise research and development groups: **Arthur C. Westrom,** electrical protective devices; **Jules Mack,** pole line hardware; **Robert Hartman,** aluminum products.

Morgan Engineering Co., Alliance, O., appointed **I. W. Evans** chief engineer of cranes. He was chief development and welding engineer.

N. A. Woodworth Co., Ferndale, Mich., elected **George Hohwart** vice president-manufacturing; **Robert W. Chadwick,** vice president-sales.

Austin S. Joy was made manager, tube and steel division, **Brumley-Donaldson Co.,** Huntington Park, Calif. **Osborne J. Stoudt** was made manager of the Oakland, Calif., branch office.

Harry L. McFeaters was elected vice president-engineering, **Pennsylvania Engineering Corp.,** New Castle, Pa. He was chief engineer.

A. C. Persson was named north central district sales manager of pressure vessels and heat exchangers for **A. O. Smith Corp.** He is at Chicago.

William E. Ryder was made general sales manager, **Belmont Smelting & Refining Works Inc.,** Brooklyn, N. Y. He was vice president of K W Battery Co. and manager of eastern operations.

Lone Star Steel Co., Dallas, elected **John M. Morris** vice president-purchasing and secretary; **Max R. Dodson,** vice president-controller.

George N. Levesque was made director of research, **Brown & Sharpe Mfg. Co.,** Providence, R.I. He was director of research in the machine tool division.

John N. Miller was promoted to vice president-general operations of **Jessop Steel Co.,** Washington, Pa., and its subsidiaries. He was assistant to the president. **Harry K. Taylor** was promoted to vice president-operations, headquarters plant. He was assistant vice president-operations.

Stanley N. Johnson was elected an executive vice president of **Motor Wheel Corp.,** Lansing, Mich., in charge of the automotive division. He succeeds **J. A. Watson,** retired. Mr. Johnson was vice president-automotive manufacturing.

Richard M. Hanselman was made manager of the plant engineering department, **Mercury Division,** Ford Motor Co., Dearborn, Mich. **Andrew A. Kucher** was elected a vice president of Ford, appointed vice president-engineering and research.

Frederick W. Leslie joined **Morgan Construction Co.,** Worcester, Mass., as sales engineer in its wire machinery department. He was general superintendent at G. F. Wright Steel & Wire Co.

Robert L. Baddorf was made chief engineer of **Topp Mfg. Co.,** Los Angeles, division of Topp Industries Inc. He was chief engineer and works manager, Mechaponents Division, Servomechanisms Inc.

J. Gaston Kilgore was elected president and chairman of **Harmon-Koester Steel Corp.,** San Diego, Calif.

Dr. Charles J. Kentler Jr. was named New York district sales manager; **Charles B. Goff Jr.,** Pittsburgh district sales manager, me-

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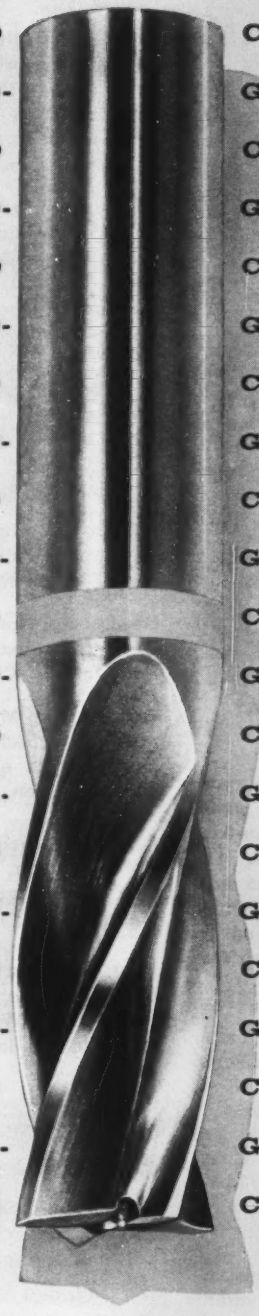

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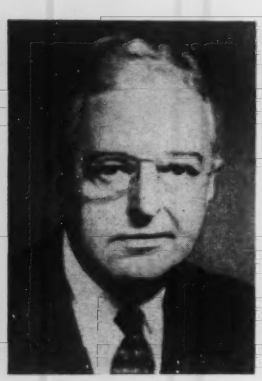
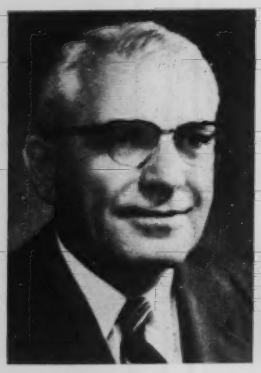


JOHN B. GIRDLER
Vanadium commercial v. p.

EDWARD J. FERRIS JR.
P&W factory manager



ALFRED J. SHERMAN
Monarch Machine mfg.-v. p.

PHILIP A. SCHEUBLE JR.
joins Vapor Heating Corp.

W. HARRISON LACKEY
Lukens gen. sales mgr.

ter and valve division, **Rockwell Mfg. Co.**

Alfred J. Sherman, general superintendent at **Monarch Machine Tool Co.,** Sidney, O., was elected vice president-manufacturing. **Fred C. Dull** was elected vice president and treasurer, **Frank J. Graziano,** secretary.

Standard Pressed Steel Co. named **James C. Humphries** manager of the west coast territory with headquarters in Los Angeles. **Donald J. Morris** was made manager of the six-state Dallas territory; **Robert W. Dando,** manager, Philadelphia territory.

Gordon A. Carlson joined **W. L. Maxson Corp.** as vice president of manufacturing facilities at Old Forge, Pa. He was vice president-general manager of Kearfott Mfg. Corp.

William S. Stamp was made Buffalo district manager, **Clark Controller Co.** He succeeds **Harry Cook,** now manager of industrial sales, Cleveland.

Philip A. Scheuble Jr. joined **Vapor Heating Corp.,** Chicago, as general manager of its Vap-Air Division. Formerly with A. O. Smith Corp., he served as an administrative engineer with its three aircraft divisions, as well as a member of its central executive staff.

W. Harrison Lackey was made general sales manager, **Lukens Steel Co.,** Coatesville, Pa. **W. Roy Widdoes** was made assistant to the president.

Hugh A. Dovey was made assistant district sales manager of **Republic Steel Corp.'s** New York office.

Kaiser Aluminum & Chemical Sales Inc. appointed **R. W. Wyman** assistant product manager for rod, bar and wire products. He is in Chicago.

Fansteel Metallurgical Corp. appointed **Mitchell R. Urbanski** chief engineer of its tantalum-columbium plant now under construction near Muskogee, Okla.

Lee S. Wade was made general sales manager, **All-State Welding Alloys Co. Inc.,** White Plains, N. Y. He was regional manager for a large portion of the Midwest.

John B. Girdler was made commercial vice president-sales, a new position at **Vanadium Corp. of America,** New York. He was assistant vice president and general manager of sales.

Edward J. Ferris Jr. was promoted to factory manager, machinery division, **Pratt & Whitney Co. Inc.,** West Hartford, Conn. He has been general division superintendent.

William M. Combs was made vice president, Gulf division, **Walworth Co.** He is at Houston.

Jeremiah Raymond was named sales manager for **Rollins Steel Corp.,** Los Angeles.

Edward H. Rofe was made chief engineer of **Sahlin Engineering Co. Inc.,** Birmingham, Mich.

Dewey R. Holcombe was named New York district sales manager for **Pfaudler Co.**

Gen. William M. Hoge, former commander-in-chief of the Army in Europe, was elected chairman of **Interlake Iron Corp.,** Cleveland.

A. Blair Powell was made general sales manager, **Mason-Neilan Division,** Worthington Corp., Norwood, Mass.

Paul L. Lantz was made production manager, abrasive division, **Norton Co.,** Worcester, Mass. He succeeds the late **George A. Fyrberg.**

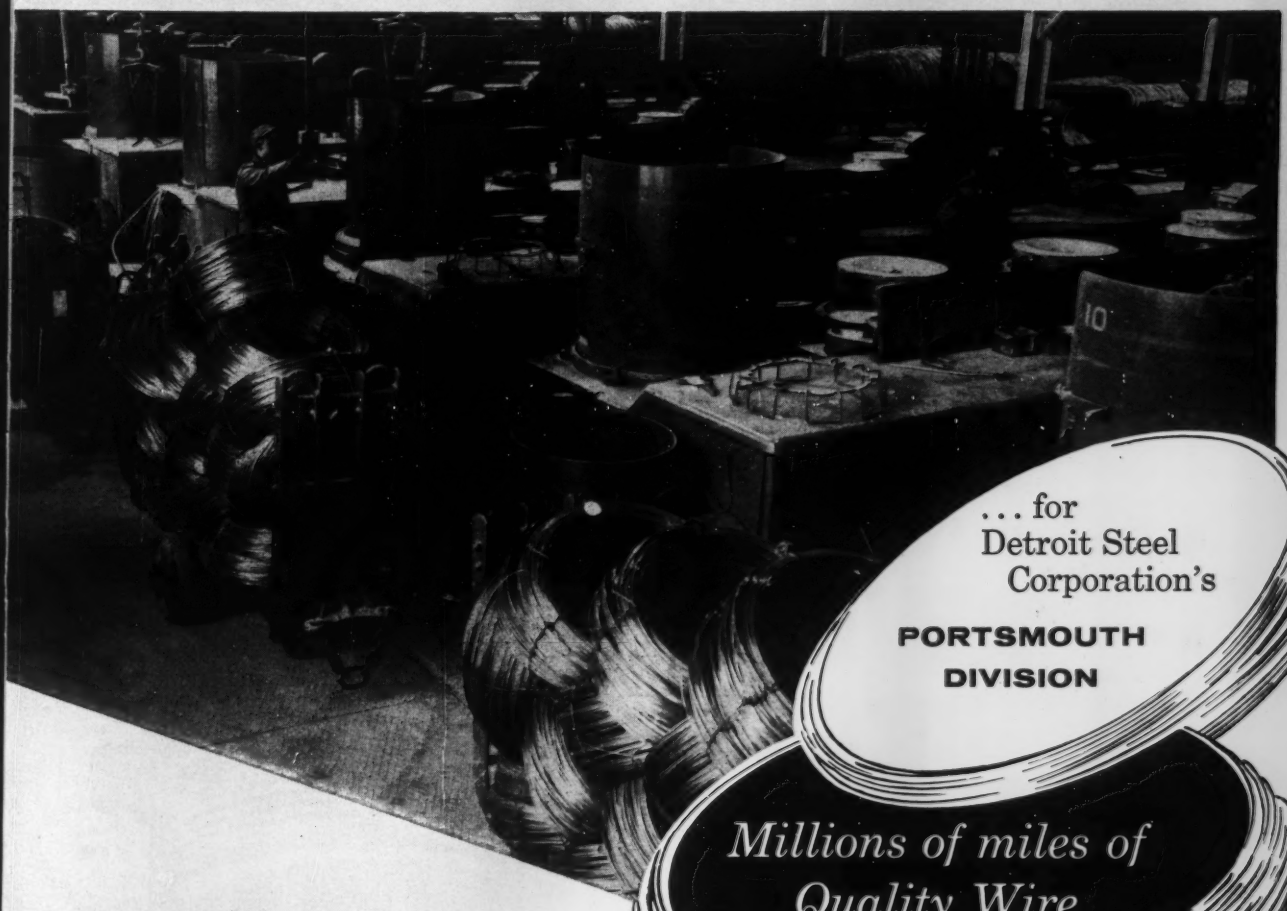
OBITUARIES . . .

Raymond F. Schutz, 62, assistant plant manager, **Bucyrus-Erie Co.,** Milwaukee, died Apr. 30.

Peter George, 64, supervisor of engineering, **Llewellyn Mfg. Co.,** San Diego, Calif., died Apr. 30.

Mark R. Colby, 76, president, **Colby Steel & Engineering Co.,** Seattle, died May 3.

Herbert V. Dodd, 38, plant superintendent, **Aro Equipment Corp.,** Cleveland, died May 8.



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Corporation's

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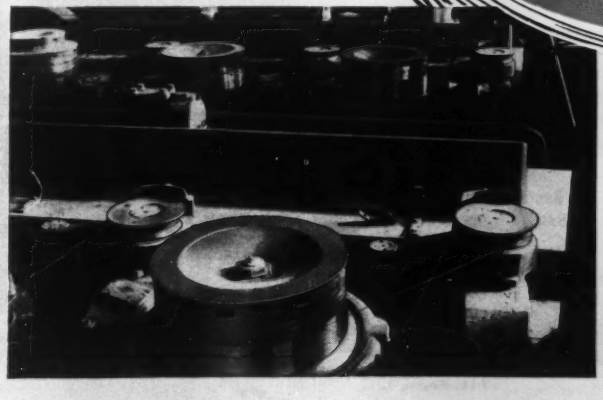
DIVISION**

*Millions of miles of
Quality Wire*

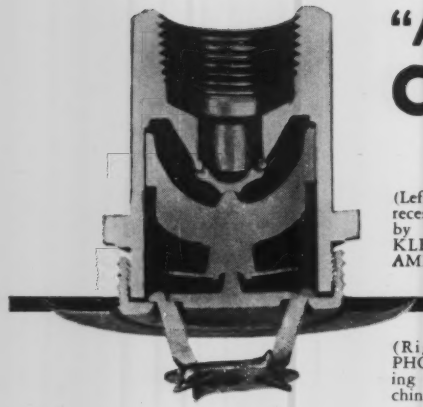
with **VAUGHN®
HRM
MOTOBLOX®**

At PORTSMOUTH, Vaughn Motoblox serve with steadfast dependability in producing wire of highest quality—on exacting production schedules. The Portsmouth battery of HRM Motoblox is the original installation of this type of machine, and we are proud indeed of its impressive service record.



The VAUGHN MACHINERY CO. CUYAHOGA FALLS, OHIO, U.S.A.

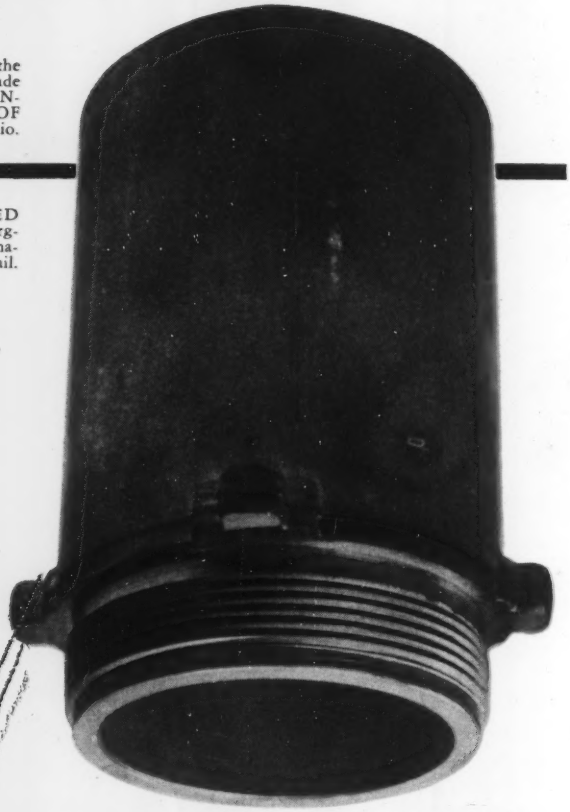
COMPLETE COLD DRAWING EQUIPMENT—Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys



"Automatic" Sprinkler CUTS COSTS 20%

(Left) CUT-AWAY view of the recessed Sprinkler head made by "AUTOMATIC" SPRINKLER CORPORATION OF AMERICA, Youngstown, Ohio.

(Right) UNRETOUCHED PHOTO of Revere Brass Forging sprinkler body before machining, enlarged to show detail.



. . . by switching to

REVERE BRASS FORGINGS

HOW SAVINGS WERE MADE

PRESSURE TESTING AND REJECTS ELIMINATED . . . ASSEMBLY RATE NEARLY DOUBLED . . . PRODUCT APPEARANCE IMPROVED

COPPER • BRASS • 18 01 • REVERE • ALUMINUM

The sprinkler body you see above was originally made of cast bronze. In order to obtain the close tolerances required, the casting had to be excessively machined. In addition, each casting, after machining and prior to assembly, had to be pressure tested. Due to porosity many castings failed and rejects piled up.

Engineers of the "Automatic" Sprinkler Corporation of America consulted with Revere's Technical Advisory Service and as a result asked Revere to make up a forging. After extensive tests, the Revere Brass Forging was adopted, because it was found that closer tolerances with a minimum of machining were possible, elimination of sand holes did away with rejects entirely, pressure testing was no longer necessary and better appearance made a more sales-appealing product.

Here you have still another money-saving example of Revere supplying the right metal in the right form to do the best possible job with the greatest economy . . . whether it is brass, copper or aluminum or any one of their alloys. Perhaps Revere can help you.

THIS STORE is a typical example of how the "Automatic 400" Ceiling Sprinkler fits into modern decor, extending approximately only about ½" below the ceiling line.

REVERE COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

Rome Manufacturing Company Division, Rome, N. Y.

Sales Offices in Principal Cities, Distributors Everywhere

SEND TODAY FOR THIS INFORMATIVE CATALOG: Address: Revere Copper and Brass Incorporated, Rome Manufacturing Company Division, P. O. Box 111, Rome, N.Y.

Barium To Expand

Blast furnace and oxygen converters will be erected as part of integrated mill

BARIUM STEEL CORP., New York, plans to expand its steelmaking facilities in Burlington county, New Jersey. The plant site is about 10 miles downstream from the Fairless Works of United States Steel Corp. on the Delaware river.

J. A. Sisto, chairman, says facilities will include a blast furnace and oxygen converters. (Converters are used in the production of ingots.) The goal of the program is a completely integrated plant. Mr. Sisto says a big reduction in production costs is expected.

Consumer Outlet—The first stage of the program calls for the production of upward of 80,000 tons of steel ingots. They will be used initially at the corporation's mills at Harrisburg and Phoenixville, Pa. Upon completion of the blast furnace, Barium's blast furnace at Chester, Pa., will continue to operate as a producer of merchant pig iron.

Commenting on current business, Mr. Sisto says the new tube mill at Phoenixville is contributing materially to sales and profits and that demand for plates and structural steel, the corporation's principal products, is continuing at high levels.

Republic Industrial Corp. is now operating as a wholly owned subsidiary of Barium Steel Corp. It is taking over these manufacturing and processing divisions: Bayonne Bolt Corp., Clyde Iron Works Inc., Cuyahoga Spring Co., Erie Bolt & Nut Co., Geometric Stamping Co., Industrial Forge & Steel Inc., Wiley Mfg. Co. R. Eberstadt is chairman of Republic Industrial.

New Names for Top Firms

Several firms in the metalworking and allied industries have changed their names recently. Included are:

Lake Erie Engineering Corp., Buffalo, changed its name to **Lake Erie Machinery Corp.**

Carrier Corp. has changed the designation of its Payne Division to the **Payne Co.**, Monrovia, Calif.

Linde Co., a division of Union Carbide Corp., was formerly Linde Air Products Co., a division of Union Carbide & Carbon Corp., New York.

The corporate name of Glenn L. Martin Co., Baltimore, was changed to the **Martin Co.**

KeMalloy Corp. changed its name to **HICA Inc.**, Shreveport, La.

The name of National Distillers Products Corp. was changed to **National Distillers & Chemical Corp.**, New York. The firm's chemical business will continue to be conducted under the divisional name of U.S. Industrial Chemicals Co.

City Auto Stamping Co., Toledo, O., will be renamed **Globe-Wernicke Industries Inc.**

Air Associates Inc., Teterboro, N. J., has changed its name to **Electronic Communications Inc.**

Stockholders of International Metal Industries Ltd., Charlottetown, P.E.I., Canada, have voted to change the corporate name to **John Wood Industries Ltd.**

Atlas Exploration Co., Houston, is now **Atlas Laboratories Inc.**

Builds Automatic Tube Mill

Mannesmann Tube Co. Ltd. will inaugurate its automatic seamless tubing mill at Sault Ste. Marie, Ont., on June 15. Tubes 4.5 to 10.75 in. OD will be produced. Rated annual capacity of the $20-million plant is 225,000 tons.

Wheeling Opens Buffalo Branch

Wheeling Corrugating Co., subsidiary of Wheeling Steel Corp., Wheeling, W. Va., opened a warehouse at 1722 Walden Ave., Buffalo, N. Y. Products stocked include household metalware, galvanized sheets, roofing, metal lath, expanded metal, suspension systems for acoustic ceilings and cut nails.

Promotes Powdered Metals

An expanded sales and customer metallurgical service program has been announced by Republic Steel Corp.'s Metal Powder Division, Toledo, O. Heading the program is

(*Please turn to page* 126)

YARD and FACTORY

TRAILERS

Fifth wheel steer. Pneumatic tires. Steel deck. Oak end and side racks.

CUSTOM-BUILT and quality-built for long-time, low-cost service. Flat steel wheels, solid rubber or pneumatic tires. Fifth-wheel or four-wheel knuckle steer. Steel or wood deck, or special superstructure. Any desired capacity.

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OUR 42ND YEAR

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A-1051

This plant took to the air to get

ANACONDA 3/c 500 Mcm 5kv shielded Aerial Cable being pulled at large midwest plant. Cable was installed on steel towers leading from substation to plant facilities.

new power fast —at low cost

Installed Anaconda 5kv Aerial Cable

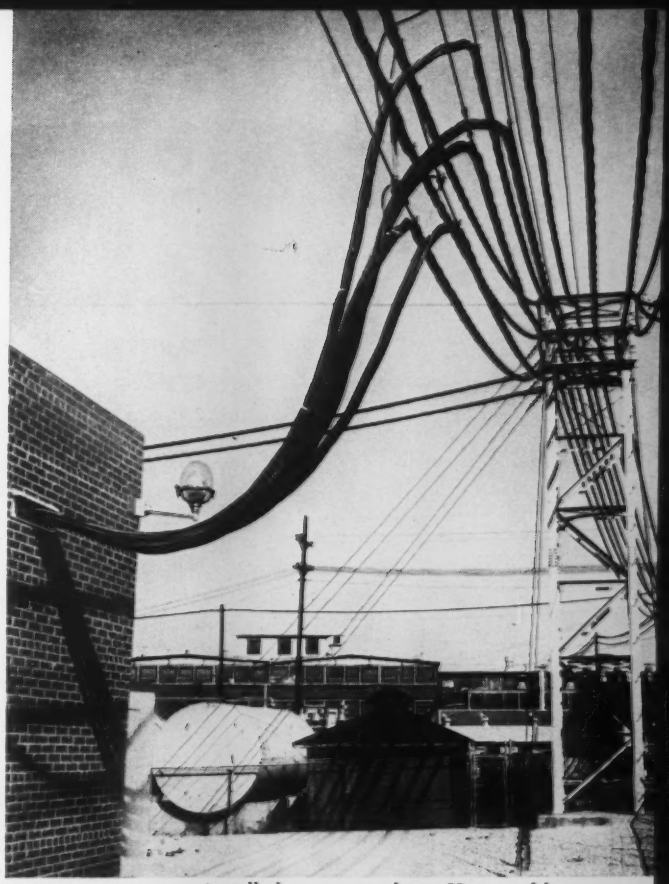
First, this major manufacturer looked at original costs. Then upkeep. And like so many others today, decided on Anaconda Aerial Cable for their new high-voltage distribution system.

Look how it paid off! Easy splicing, tapping and terminating simplified installation . . . reduced time and labor. There was no ditch to dig or fill. No underground pipes or structures to dodge. And no ducts, crossarms or insulators were needed. Their aerial cable is always handy for maintenance. And it's safe, neat.

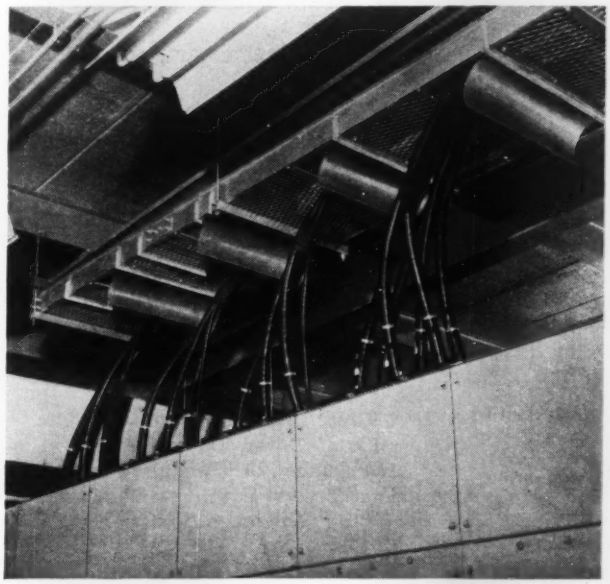
Finest Aerial Cable. Anaconda Aerial Cable is made with tough neoprene jacket that offers highest resistance to weather, corrosive atmosphere, sun. Special Anaconda Type AB butyl insulation gives extra protection against ozone, heat and moisture.

For the full story on aerial cable, call the Man from Anaconda or your nearest Anaconda distributor. Or write: Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

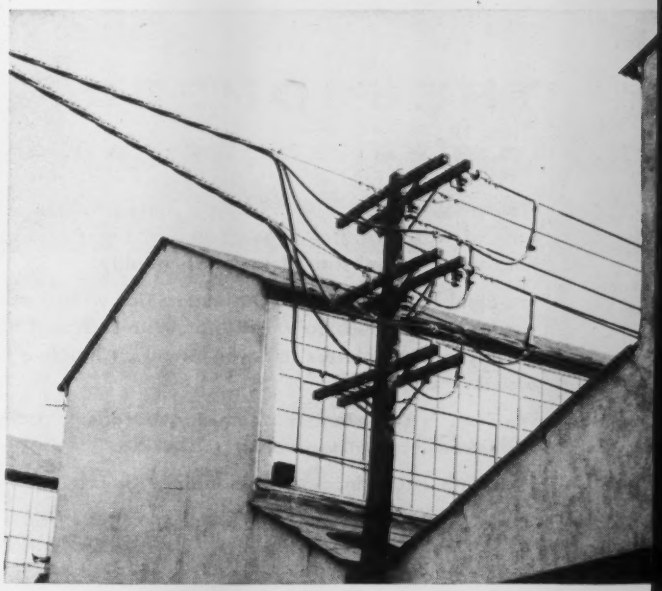
57339



TWELVE CABLES were installed to serve plant. Here, cable drops off messenger to substation entrance.



INSIDE THE SUBSTATION, cables are laid in overhead aluminum racks, then terminated in switch gear.



TWO OF THE 12 CABLES branch off to serve separate building. Aerial cable is terminated at pole structure.

See the man from ANACONDA®

for AERIAL CABLE

THE PIONEER

in steel shot manufacturing

Pioneered in 1948, backed by 60 years of experience in manufacture of abrasive, Tru-Steel shot was the first high-carbon, fully heat-treated steel shot of tool steel quality.

Tru-Steel has maintained its leadership, with a **special process** to assure solid, round, balanced shot. With sufficient **hardness** to clean quickly and toughness to wear longer, it has five times the life of ordinary abrasive.

Tru-Steel is consistent in chemistry, hardness, grain size and uniform from one lot to another.

It has no equal in general cleaning. Unexcelled for shot peening and sheet or plate descaling.

Available in all SAE sizes in easy-to-handle 50 lb., double walled burlap bags.

TRU-STEEL SHOT

STEEL SHOT PRODUCERS, INC.®

Butler, Pa.

Subsidiary of Pittsburgh Crushed Steel Co.

Pittsburgh 1, Pa.

(*Concluded from page* 123)

James K. Nyburg, division manager of sales. He will be assisted by Leon J. Printz, former metallurgist with the Chrysler Corp.

GM Division Expands

New Departure Division of General Motors Corp. has increased facilities for the manufacture of steel balls at its Bristol, Conn., works. The expansion was prompted by growing consumer demand, reports Paul W. Rhame, division general manager.

Opens Pittsburgh Sales Office

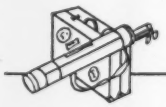
The Cylinder Gas Division of Air Products Inc., Allentown, Pa., opened a new sales office in the Grant Building, Pittsburgh. Facilities for manufacturing oxygen, argon and other gases will be located in Aliquippa, Pa.

Black & Decker Buys Plant

Black & Decker Mfg. Co. Ltd., Toronto, purchased a 58,000 sq-ft manufacturing plant in Brockville, Ont. Initial operations will include motor winding and assembly of portable electric tools.

Foxboro Plans Expansion

Construction will start in July on a 175,000 sq-ft addition to the Foxboro Co.'s instrument manufacturing plant at Foxboro, Mass. The facilities are expected to be ready for occupancy by early summer of 1958.

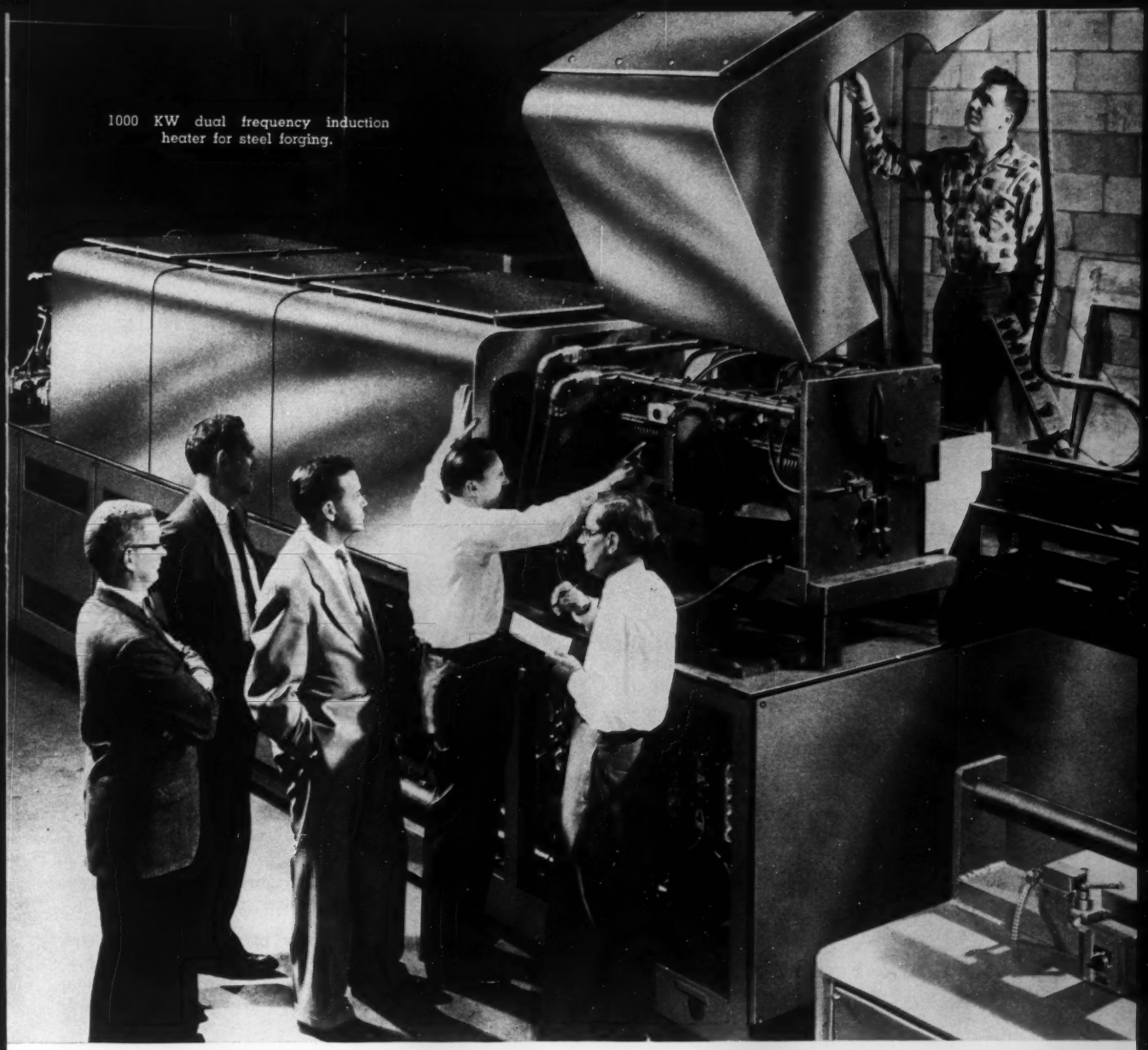


VACATIONS

Greer Steel Co. will close its mills at Dover, O., and Anderson, Ind., June 29 through July 14. Partial service will be maintained at the general office.

General Metals Corp. will close the plants of its Oakland, Calif., Foundry & Forge Division June 24 to July 5, inclusive. Offices will remain open.

Servomechanisms Inc. will close its Hawthorne, Calif., plant July 22 through Aug. 4. Its receiving



1000 KW dual frequency induction heater for steel forging.

James McLaughlin, Sales Manager, Low Frequency; Pete Hassell, Sales Manager, High Frequency; John Logan, President; Bruce McArthur, Vice President; Ted Kennedy, Chief Engineer

the Brass does much more than "TAKE A LOOK"

The Magnethermic brass has a personal interest in this heater.

They have combined their talents on the original design, the application engineering, and the fabrication. Little wonder that they take this close look in the final stages of production.

This procedure is standard—not the exception. All Magnethermic Heaters, large or small, receive day-to-day supervision of the President, Vice President, Chief Engineer and other well-known authorities on induction heating.

Specialized attention to each order for induction heating equipment . . . high, low, or dual frequency can be applied only in a specialized company like Magnethermic where induction heating is the only business.

Induction Heating Equipment 60 to 450,000 cycles

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Translucent structural panels with Underwriter's Label and Factory Mutual Approval to meet restrictive fire codes.

New Corrulux PyroPanl gives all the advantages of Corrulux . . . high strength, shatterproof, excellent light transmission, long life, resistance to corrosion, rot, warpage and cracking . . . with an important plus — FIRE RESISTANCE.

Flame resistance is chemically, permanently locked into PyroPanl. While these panels will burn under a blow torch flame, they extinguish themselves when the source of flame is removed.

PyroPanl is available in industrial colors, flat sheets and many corrugations.

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department will be closed, but some purchasing personnel will remain on the job.

ASSOCIATIONS

Dr. George A. Roberts of Vanadium-Alloys Steel Co., Latrobe, Pa., was elected chairman and president of the **Metal Powder Association,** New York. Other officers are: C. L. Snyder, General Ceramics Corp., Keasbey, N.J., first vice president; C. G. Johnson, Presmet Corp., Worcester, Mass., second vice president; Kempton H. Roll, executive secretary and treasurer. Chairmen of divisions are: E. H. Klein, New Jersey Zinc Co., New York, Powder Producers Division; C. L. Snyder, Ferrites Division; D. L. Almquist, Stackpole Carbon Co., St. Marys, Pa., Iron Powder Core Division.

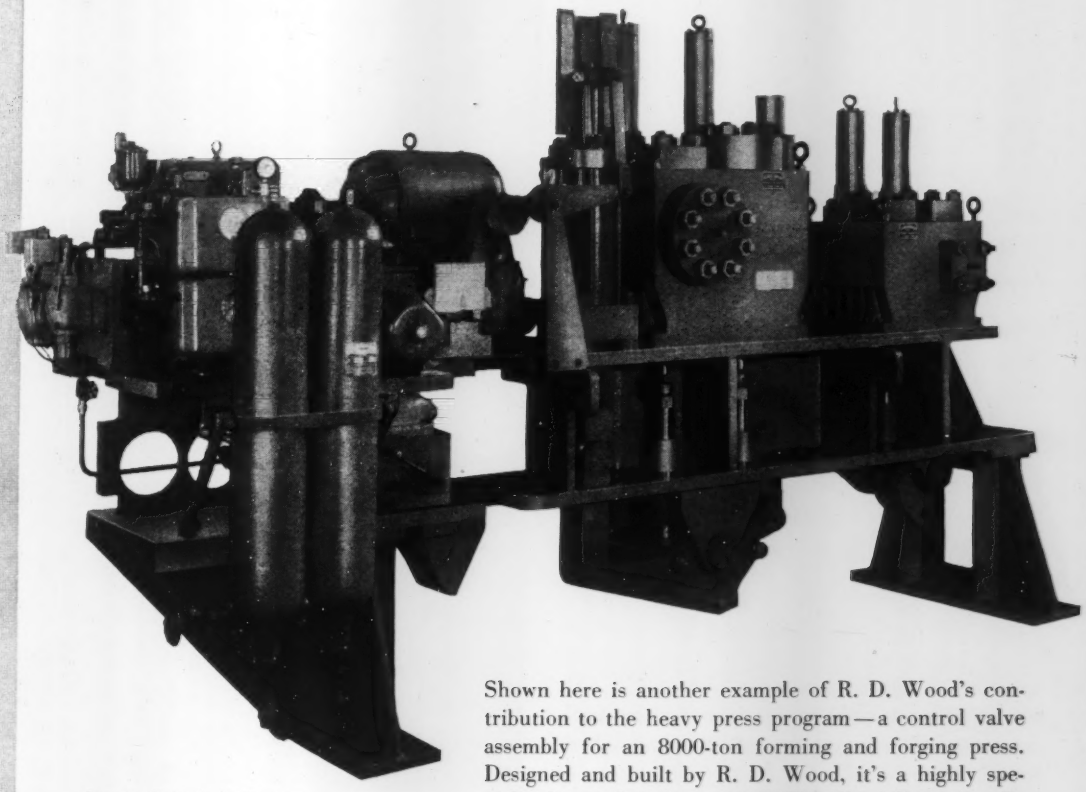
Air-Conditioning & Refrigeration Institute, Washington, elected these officers: Lud Emde, Temprite Products Corp., Birmingham, Mich., president; Don V. Petrone, Typhoon Air Conditioning Co., division of Hupp Corp., Brooklyn, N.Y., vice president; Rudy Berg, Copeland Refrigeration Corp., Sidney, O., treasurer.

Officers of the **Industrial Gas Equipment Division** of the **Gas Appliance Manufacturers Association,** New York, are: Chairman, E. J. Funk Jr., C. M. Kemp Mfg. Co., Baltimore; vice chairman, R. C. LeMay, Selas Corp. of America, Philadelphia; executive committee member, James H. Sands, Eclipse Engineering Co., Rockford, Ill.

Edward E. Slowter was elected vice president of **Battelle Memorial Institute,** Columbus, O.

Western Reinforcing Steel Fabricators Association, formed earlier this year at Oakland, Calif., to promote wider markets for the industry's products, held its first membership meeting in San Francisco. Seven western states sent 75 delegates. George L. Cobb, Soule Steel Co., San Francisco, was elected president. Leonard Ross, Blue Diamond Corp., Los Angeles, was elected vice president; and Stephen G.

Big help in heavy press program



Remote electro-hydraulic servo control valve assembly. Length is 14 feet; height 9 feet.

Shown here is another example of R. D. Wood's contribution to the heavy press program—a control valve assembly for an 8000-ton forming and forging press. Designed and built by R. D. Wood, it's a highly specialized type. It indicates R. D. Wood's ability to handle the most difficult valve engineering and manufacture.

Other standard R. D. Wood high-pressure hydraulic valves include stop, operating, check, relief, and safety types. Since 1803, the name R. D. Wood has stood for superior products. Write for details on R. D. Wood high pressure hydraulic valves for every purpose.

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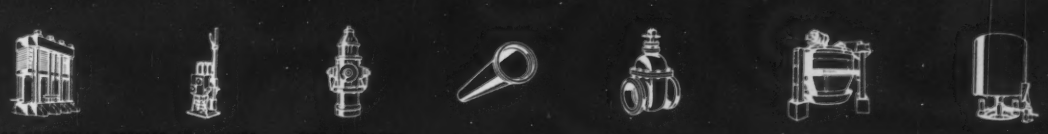
PUBLIC LEDGER BUILDING • PHILADELPHIA 5, PENNSYLVANIA

Representatives in Principal Cities



Controlled Quality

MAKES THE DIFFERENCE!

① Faster Machining
② Longer Tool Life
③ Finer Finish

WITH

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COLD FINISHED

LEADED STEELS

AND

SCREW STOCKS

Complete range of analyses in quality-controlled free-machining LEADED STEELS and SCREW STOCKS to your specifications

COLD FINISHED STEELS

Carbon, Alloy and Leaded Steels
Turned and Polished Shafting
Turned and Ground Shafting
• Wide Flats up to 14"
All types of furnace treated Steels

SPECIALISTS IN COLD FINISHED STEELS EXCLUSIVELY

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GENERAL OFFICES:
Gateway Center, Pittsburgh 30, Pa.
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Works: Ambridge, Pa.—Chicago, Ill., Newark, N.J.—Putnam, Conn.

Herrick, Herrick Iron Works, Oakland, Calif., secretary. F. S. Clough is manager of the association.

Scientific Apparatus Makers Association, Chicago, elected these officers: President, R. E. Welch, W. M. Welch Mfg. Co., Chicago; president pro tem, Dr. G. A. Downsbrough, Boonton Radio Corp., Boonton, N.J.; treasurer, T. M. Mints, E. H. Sargent & Co., Chicago.

CONSOLIDATIONS

H. K. Porter Company Inc., Pittsburgh, acquired **R. Thomas & Sons Co. Inc.,** manufacturer of high voltage and other electrical porcelain, Lisbon, O. The Thomas operations will be combined with Porter's Delta-Star Electric Division. Porter recently acquired Federal Wire & Cable Co. Ltd., Guelph, Ont.

Carpenter Steel Co., Reading, Pa., is carrying on negotiations with the trustees of **Northeastern Steel Corp.,** Bridgeport, Conn., "regarding possible acquisition of control of Northeastern."

Milwaukee Bronze Casting Co. Inc., merged with Allis Foundry Products Inc., Milwaukee. The new firm, Allis Foundry Products Inc., will eventually consolidate operations at the Milwaukee Bronze plant at 145 S. First St., that city. Officers are: John H. Kamin, president; R. A. Hipke and P. C. Hanson, vice presidents; W. R. Matschulat, secretary-treasurer.

Pacific Industries Inc., San Jose, Calif., acquired **Hufford Machine Works Inc.,** El Segundo, Calif., and will operate the property as a wholly owned subsidiary.

A proposal for the merger of **Dixie Cup Co.,** Easton Pa., with **American Can Co.,** New York, has been approved by directors of the two firms.

Controlled Products Inc., Los Angeles, manufacturer of aircraft component parts, acquired **Ensign Carburetor Co.,** Alameda, Calif.,

(*Please turn to page* 134)

The Leaders of American Industry

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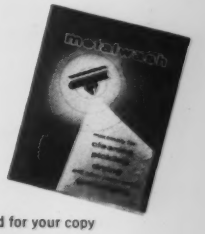
METALWASH

MACHINERY

For Cleaning, Pickling, Drying, Heat Treating, and other Metal Parts Processing



RIGHT NOW your cleaning and finishing departments are ready to benefit from the same gains in efficiency and capacity that many leaders of American Industry already have achieved . . . by specifying Metalwash.

When you specify Metalwash you share in the skill and experience we have developed in more than thirty years of specializing in the design and manufacture of machinery and methods for metal parts processing.

Write today describing the nature of your cleaning and finishing requirements . . . a Metalwash representative will call to show you our approach to your problems.

Send for your copy of our 20-pp catalog. It illustrates and describes 50 different applications of Metalwash metal parts processing machinery.

OUR 30th YEAR

INDUSTRIAL DIVISION

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Representatives in principal cities in the U. S. and Canada

A Boeing B-47 Stratojet medium bomber gets a take-off assist from 30 Phillips Petroleum Company M15 JATOs.

N-A-X HIGH-TENSILE is readily formed and welded. Here, before welding, a worker sizes the container's aft head, drawn by a 250-ton press. Bottom forging is locked in.

N-A-X HIGH-TENSILE STEEL FORMS AND WELDS READILY

Formability: Even at the higher strength levels (50% greater than mild carbon steel) this material can be cold formed and drawn into very difficult stampings and cold formed shapes.

Weldability: Its weldability by any process is excellent, maintaining toughness through a wide range of temperatures. Under-bead cracking tests are excellent. Using American Welding Society standard bead-weld testing, shows under-bead hardness rises only to 95 Rockwell from 80-85 Rockwell prior to welding.

Make *your* product better, too—
with this high-strength steel

How N-A-X® HIGH-TENSILE STEEL

supplied the money-saving answer to a critical take-off problem

JATO rockets boost heavily laden planes into the air faster, let them operate from shorter runways. A new JATO developed by Phillips Petroleum Company required a case that would endure a pressure of 1,000 pounds per square inch at the high blast temperatures. Yet it must be lightweight, easily fabricated, economical.

In 1954, 100 JATO cases of N-A-X HIGH-TENSILE steel were tested at Air Force Plant 66 near McGregor, Texas, where Phillips Petroleum is contractor-operator.

Result: The N-A-X HIGH-TENSILE case passed every test with flying colors. It *surpassed* the required standards for strength by as much as 20 percent.

The high-strength characteristics that make N-A-X HIGH-TENSILE a better steel for JATO fuel containers also make it better for many other types of pressure containers, where high strength and lighter weight are equally important. It is particularly suitable for Propane cylinders and pressure vessels for the chemical, automotive and oil industries, that must withstand severe interior pressures and handling abuses . . . and for such products as truck and trailer frames, wheels and bumpers, railroad and earth-moving equipment, shipping containers, pipe, and many others.

Other Important Advantages: N-A-X HIGH-TENSILE STEEL, compared with carbon steel, is 50% stronger • has high fatigue life with great toughness • is more stable against aging • is more resistant to atmospheric corrosion. It polishes to a high luster at minimum cost • has greater resistance to abrasion or wear • offers greater paint adhesion.

With N-A-X HIGH-TENSILE you can design longer life, strength with lightness, and economy into your products. Let us show you how.

COMPANION HIGH-STRENGTH STEEL IN THE N-A-X FAMILY

N-A-X FINEGRAIN. A low-alloy high-strength steel ideally suited for applications where the enhanced resistance to atmospheric corrosion of N-A-X HIGH-TENSILE is not required.

N-A-X
HIGH-TENSILE STEEL

N-A-X Alloy Division
GREAT LAKES STEEL CORPORATION
Detroit 29, Michigan — Division of
NATIONAL STEEL CORPORATION

N-A-X Alloy Div., Dept. B, Great Lakes Steel Corp., Detroit 29, Mich. B-1

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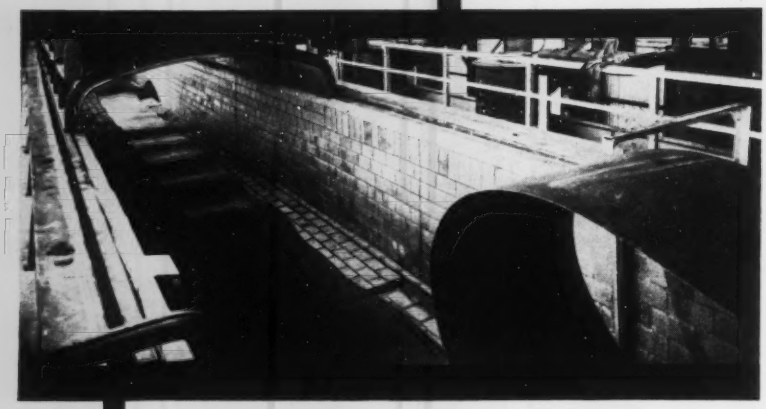
your corrosion problems solved



when you use ATLAS materials of construction

More than any other, the name, ATLAS, is specified for corrosion proof materials of construction throughout the metal working industry.

In this industry, Atlas materials, engineering and design features have accounted for tremendous savings in maintenance and replacements.

In the last quarter century, thousands of tanks have been built of Atlas materials for use by the metal working industry . . . all types, from small dip tanks to the largest continuous picklers.

Let Atlas help you solve your corrosion problems with the most complete available line of corrosion proof materials of construction in the country.

Atlas provides a complete corrosion service from on-the-spot technical advice through engineering design to complete construction facilities to carry the job from beginning to end.

- CEMENTS
- COATINGS
- LININGS
- RIGID PLASTICS

ATLAS MINERAL PRODUCTS COMPANY
MERTZTOWN, PENNSYLVANIA

Write for Bulletin CC#3 giving informative data on the complete Atlas line.

(*Concluded from page* 131)

and will move all production facilities to the new location.

Taylor Instrument Co., Rochester, N. Y., purchased **MacLee Industries Inc.**, and its subsidiary, Emmett Machine & Mfg. Inc., Akron, O.

Consolidated Diesel Electric Corp., Stamford, Conn., has purchased **Lima Electric Motor Co.**, Lima, O., and will operate it as a wholly owned subsidiary.

NEW ADDRESSES

Kuhlman Electric Co. moved its general offices to 2565 East Maple Road, New Birmingham, Mich. The mailing address is P. O. Box 288, that city.

Alco Products Inc., New York, moved its Pittsburgh district office to Greentree and Cochran roads, Scott Township, Pa. W. A. Palmer is district manager.

Chas. A. Strelinger Co. moved to 31855 Van Dyke Ave., Warren, Mich. The mailing address is P. O. Box 4674, Detroit 34, Mich.

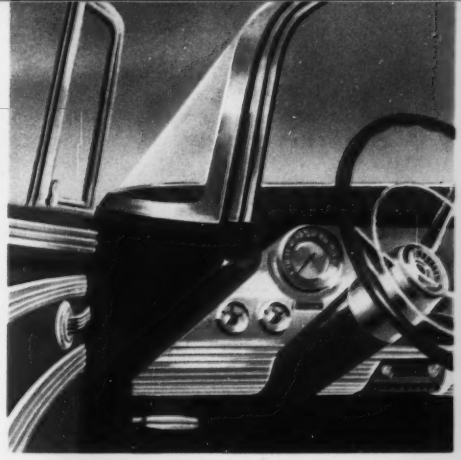
Dole Valve Co. moved its offices to 6201 Oakton St., Morton Grove, Ill.

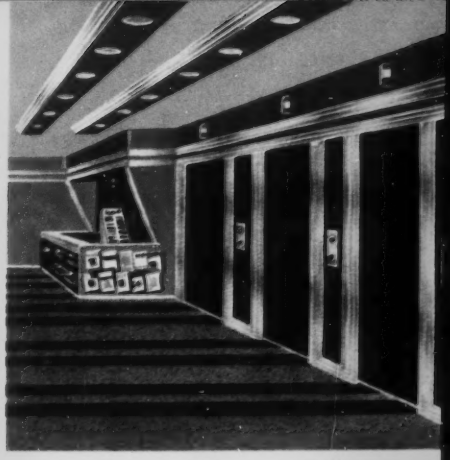
Bechler Service Corp. moved to 28 Harbor St., Stamford, Conn. The firm is a subsidiary of Andre Bechler Ltd., Switzerland, maker of Bechler Swiss automatics.

Industrial Chemicals Division of **Olin Mathieson Chemical Corp.**, New York, moved its St. Louis district sales office to 8000 Bonhomme St., St. Louis 5, Mo. Charles H. Larson is district sales manager.

Timken Roller Bearing Co., Canton, O., has moved its Buffalo industrial and steel sales office to 2960 Main St., that city.

The Statistical office of the International Tin Study Group has been closed. All correspondence should be addressed to: **International Tin Council**, 35 Piccadilly, London, W. 1, England.





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the meaning is PROFIT

mouldings of Superior Stainless

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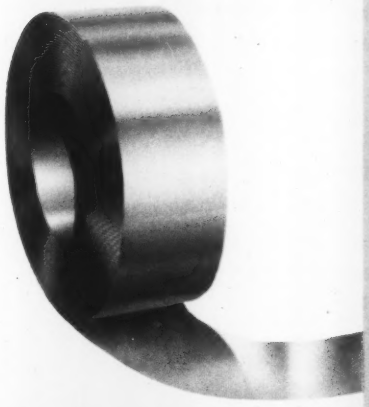
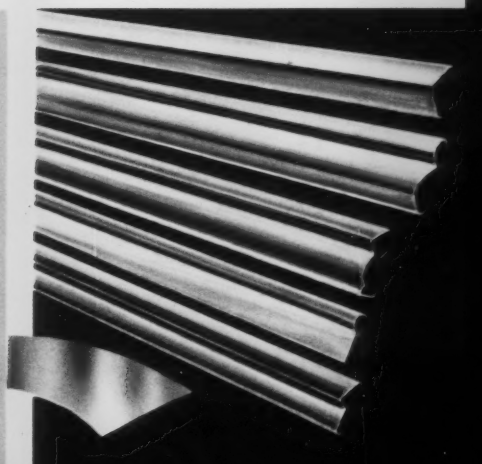


The bright world of applications for mouldings of Superior Stainless tells the story fast: *wherever these mouldings are used, profit is part of the picture!* Profit in fabrication, through Superior's uniform ease of working . . . profit in sales, from outstanding value appeal . . . profit in customer satisfaction, which builds more business! ● Let us send you the Superior Stainless Strip Steel Brochure.



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Top automotive engineers agree that the use of a forged crankshaft permits the design of a more compact engine which is a decided advantage when thinking in terms of limited space available and overall engine weight reduction.

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HARVEY, ILLINOIS • DETROIT, MICHIGAN

STEEL
May 20, 1957

Technical Outlook

TITANIUM CASTINGS— Production has a sound metallurgical basis although full-scale commercial operations are not yet possible, says Battelle Memorial Institute, Columbus, O. A market of 3500 tons can be expected by 1960 if the casting industry develops sufficiently. The potential is in aircraft, missile and chemical process industries.

BIG BLOW— Westinghouse will build a gas turbine that'll supply 125,000 cfm of air to blast furnaces at U.S. Steel Corp.'s South Works, Chicago. Said to be the first application of a gas turbine to furnace blowing, it eliminates the need for a boiler and auxiliary steam equipment. The turbine will be driven by blast furnace gas and will power an axial flow compressor.

BEARING ALLOY— High temperature jet bearings are being made from a new alloy steel developed by Bower Roller Bearing Division, Federal-Mogul-Bower Bearings Inc., Detroit. Principal elements: Nickel, 3 per cent; chromium, 1.5 per cent; molybdenum, 5 per cent. Key to high performance is said to be a patented heat treatment: Races and rollers are held at 1000°F as a final step. The maker, Republic Steel Corp., Cleveland, calls the steel Bower 315.

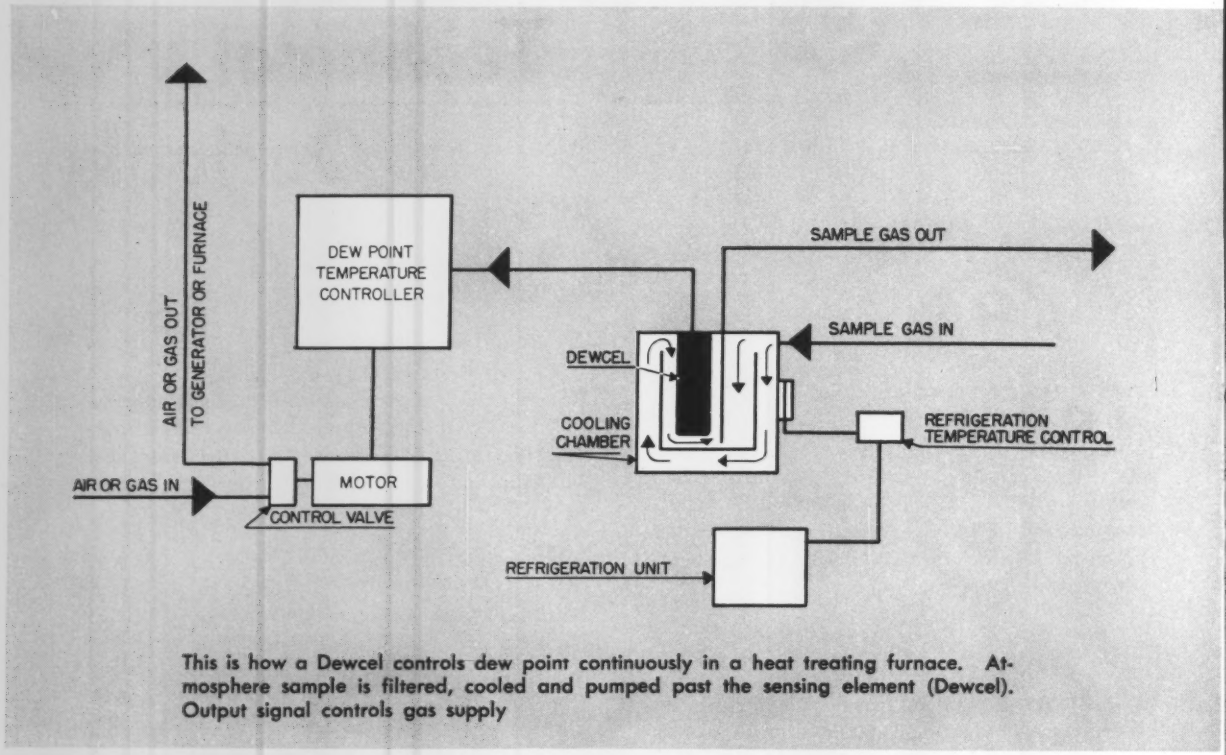
SUPERHOT— A new high temperature heat source, called Plasmatron, generates up to 15,000°K (26,540°F). It's based on an adjustable gas jet using various noble gases which are highly ionized by an electric charge. A visible flame 1 to 6 in. long is produced. Uses: Research in aerodynamics, thermodynamics, thermal chemistry, atomic physics, metallurgy and the testing of ceramics and other materials. The unit is made by Plasmatron, Santa Ana, Calif.

MODEL PLAN— Before converting a high lift slabbing mill to a universal mill, the Steel Co. of Wales Ltd. prepared an elaborate come-apart model of the mill stand and its conversion parts. As the model was disassembled and reconstructed, photographs were taken. They will be used to acquaint construction crews with each step of the conversion. The model will be used during construction to illustrate procedures for slinging and handling the heavy parts.

TOUCH TEMPERATURE— Exceptional accuracy is claimed for the Land surface pyrometer which takes temperature readings by direct contact. Typical use would be for temperature readings on ingots or billets. The instrument is calibrated to read true temperature 3/16-in. below the surface in the 100 to 2400°F range. It is available from the Fielden Instrument Division of Robertshaw-Fulton Controls Co., Philadelphia.

SPEEDY HOT DIP— A dual machine that coats wire cloth with lead or zinc is said to double the speed of the operation. It's made by the Reynold Wire Division, National-Standard Co., Dixon, Ill. Arrangement of one roller above the other permits 60-in. cloth to move through sodium hydroxide, acid, two rinses and a flux before the molten bath. One unit coats about 1½-million sq ft of cloth a month.

Metalworking Outlook—p. 89 *Market Outlook—p. 233*



This is how a Dewcel controls dew point continuously in a heat treating furnace. Atmosphere sample is filtered, cooled and pumped past the sensing element (Dewcel). Output signal controls gas supply

Atmosphere Control

Spot checks are no longer adequate for high quality heat treatment. Here are several ways to control furnace atmospheres continuously, their advantages and disadvantages

By WAYNE L. BESSELMAN
Leeds & Northrup Co.
Philadelphia

PART ONE

HEAT treaters are entering a new era of quality, one which requires continuous measurement and control of atmospheres.

Increasingly rigid specifications and metallurgical requirements have obsoleted the spot check, and indicating devices like the Orsat and dew point indicators are fast becoming inadequate.

Here are a few of the rules and some data you can use to bring your operation up to date.

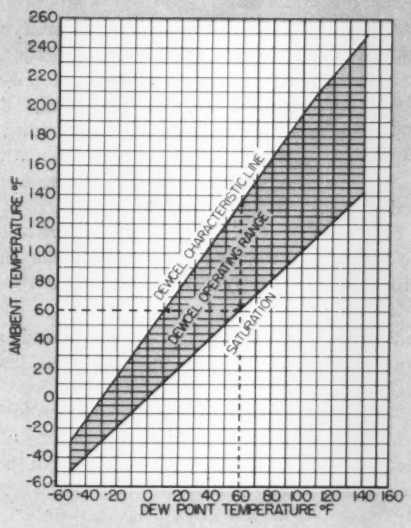
Controllers—In either reactive or protective atmospheres, it is necessary to measure and control composition or carbon potential continuously. In many cases, atmosphere quality is even more vital to the metallurgical properties of a part than is temperature. There have been many outstanding contributions to the production and understanding of the mechanism of furnace atmospheres. It is important for industry to reappraise methods of measurement and control to insure reproducibility.

Today's analyzers produce a suitable electrical or other output signal that can be continuously recorded, indicated and used for controlling purposes.

Four Types — Dew point analyzers use any one of these principles:

1. Change in conductivity of hygroscopic salt compounds.
2. Condensation of water on cooled surfaces.
3. Formation of fog by sudden expansion of compressed gas.
4. Electrolysis of salt compounds or organic liquids.

The first one depends upon the behavior of a hygroscopic salt in water vapor. If dry lithium chloride is exposed to water vapor, it absorbs moisture and dissolves, forming a saturated solution. If the salt and its saturated solution are heated, the water evaporates until the tendency of the water to escape is equal to the tendency of the salt to take on water. This is called the equilibrium point. Its



Ambient (surrounding) temperature determines range of Dewcel. Graph shows the operating range of the cell. Samples must be cooled so that the sensing element may operate properly

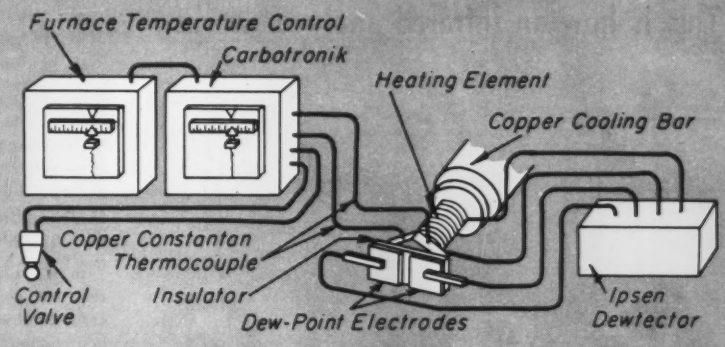
This cut-away view of a Dewcel shows the salt-impregnated glass tape with the electrical conductor-winding. Moisture absorbed by the salt in the glass tape changes its electrical resistance

temperature is a measure of the partial pressure of the water vapor in the surrounding gas—the dew point.

The primary element of such a system consists of a temperature sensing device mounted inside a thin walled metal tube covered with a woven glass tape which is impregnated with lithium chloride. The tube is wound with a pair of silver or gold wires covered with a perforated metal guard. When the salt absorbs moisture from the surrounding gas, it becomes an electrical conductor. Current passes between the two wires, raising the temperature until equilibrium is reached. This temperature is measured by the sensing device which is related to and can be calibrated to represent the dew point of the atmosphere. Accuracy is limited to that of the sensing device.

Operation—Such devices depend on the principle that dry salt is not a conductor of electricity and that a salt solution is. Two wires in contact with the impregnated glass tape will pass current only if the salt is moist and its temperature is at or below the equilibrium temperature.

The temperature surrounding the cell determines the range of dew points which can be measured. For example, if the temperature of the gas is 60°F, you can measure dew points from 60°F down to 10°F. But if the temperature is 80°F, it



Moisture condensed on the electrodes (above) completes an electrical circuit. Heater then evaporates the water. The maker, Ipsen Industrial Products Inc., Rockford, Ill., claims an electrical interlock with the temperature controller correlates dew point and carbon potential and permits direct reading of carbon

would be possible to measure dew points only between 80°F and 22°F. The Dewcel characteristic line (illustration page 139) also shows the temperature of the cell for any given dew point. For a dew point of 10°F, the equilibrium temperature of the dew cell would be near 60°F.

Since the dew points desired for most furnaces and generators are on the low side and the surrounding (ambient) gas temperatures are on the high side, it is necessary to cool the gases by refrigeration before being exposed to the primary element. The gas, after filtering, is pumped through a cooling chamber past a sensing element. The output signal registers as the dew point and controls the gas supply to either an endothermic generator or a furnace which adjusts the dew point.

Condensation—The second type depends on an analyzer which condenses water vapor passing across a narrow slot. Two electrodes are mounted at the end of a cooling element through which the gas passes. The condensed vapor completes an electrical circuit. The current flows through a heater and raises the electrode temperature above the dew point. This evaporates the condensed vapor. Moisture is alternately condensed on and evaporated from the electrode.

A copper-constantan thermocouple at the electrodes measures the dew point temperature. The accuracy of the device depends on the accuracy of the thermocouple.

There are alternate versions of the condensation principle which employs a photoelectric cell to determine the temperature of condensed vapor on a polished metal or mirror surface.

Fog Formation—The third type is an indicator only and is limited to spot checks. As far as we know, it has not been adapted to continuous recording.

Electrolysis—This method is a recent development which analyzes dew point on a coulometric principle.

An electrolysis cell contains a pair of closely spaced electrodes connected to a suitable direct current potential. The space between the electrodes is bridged by a film of phosphorus pentoxide, which is substantially a nonconductor. When moisture-bearing gas passes over the electrodes, it reacts with the pentoxide to form phosphoric acid, which is a good electrical conductor. Current passes between the electrodes. Electrolysis of the water forms hydrogen and oxygen which pass out with the sample gas. For a constant mass-rate of flow, the current passing between the electrodes is proportional to the concentration of water vapor in the gas stream. The unit is reported to be sensitive to a few parts per billion, and is adaptable to continuous recording and controlling.

Selective—Infrared analyzers are another recent development. They accurately and continuously measure CO_2, CO and CH_4, even in the presence of interfering gases, which isn't possible for analyzers operating on the thermal conductivity principle.

Such analyzers operate on the selective absorption of infrared energy and utilize two fundamentals:

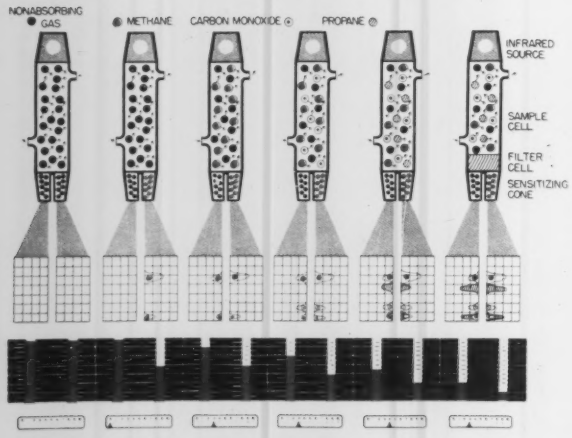
1. Each gas compound absorbs a portion of infrared radiation that no other gas absorbs.
2. The amount of radiation absorbed is proportional to the concentration of the gas compound.

Extremely high accuracy of measurement is possible. A full scale range of 0 to 0.5 per cent CO_2 will produce a sensitivity, reproducibility and readability of 0.005 per cent.

Infrared analyzers can sense one gas compound in the presence of others which absorb energy in the same spectrum area (illustration below).

Hot Wire—This analyzer is another type which continuously and directly measures the carbon content of a furnace atmosphere. It operates on the principle that the electrical resistance of iron and its alloys at elevated temperatures changes with carbon content. The illustration (page 141) shows the

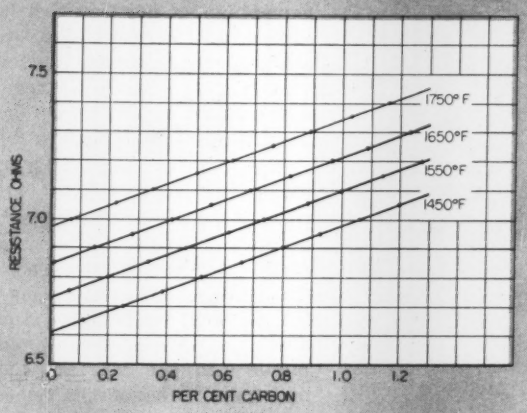
This is how an infrared analyzer works:



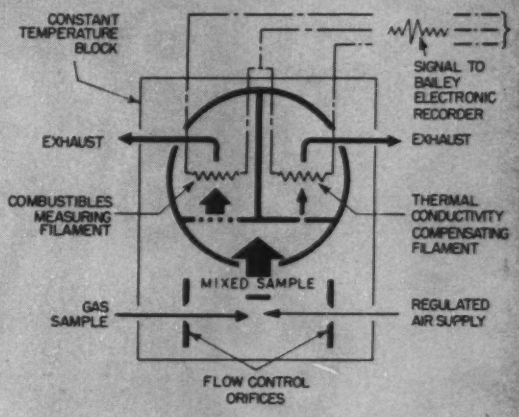
In all the sections shown (left), the infrared source is at the top. The sample cell is below, filled with nitrogen (a non-absorbing gas), and below that a filter cell. At the bottom are sensitizing cones and a differential thermopile (represented by the graphs). Graphs show that no radiation is absorbed. Both sides of the differential thermopile receive equal radiation and produce no voltage differential.

In the second section, nitrogen still flows through the sample cell, but pure methane has been sealed in the right sensitizing cone. It absorbs all the radiation passing through, and the radiation falling on the methane side of the thermopile decreases. Since there is no methane in the sample cell, the differential reference voltage is actually zero, and the analyzer is adjusted to zero.

In the third section, the sample gas contains 3 per cent methane in nitrogen. This absorbs its proportionate amount of energy from the left thermopile while, as before, all the energy due to methane is absorbed from the right thermopile so that the recorder shows 3 per cent methane.



Graph shows the straight-line relationship between the amount of carbon in a typical iron alloy and the electrical resistance of a hot wire



Here is the flow diagram of a typical analyzer which measures the amount of carbon monoxide, methane and hydrogen in an atmosphere

relationship of resistance versus the percentage of carbon at various temperatures for a typical iron alloy.

The primary element (example: a Carbohm) is inserted into the furnace work chamber. The atmosphere is continuously drawn past the element so that its measurement of carbon potential is the same as that of the work being treated.

Because the carburizing reaction is reversible, a Carbohm is sensitive to changes in carbon potential of the atmosphere, and a continuous record is easily obtained. Temperature compensation is necessary so that the analyzer may be used over a range of 1450 to 1750°F. It is also calibrated automatically. A secondary check of the atmosphere potential can be made by placing thin shims of AISI 1010 steel in the furnace. When they reach homogeneous equilibrium with the furnace gas, they are removed and analyzed.

Filaments — Combustible analyzers measure and control the percentage of CO, CH_4 and H_2 in furnace or generator atmospheres.

The basic principle of available analyzers is essentially the same. They depend on the temperature rise of a platinum filament when exposed to the combustion of metered quantities of a gas and air sample. Here's how they work:

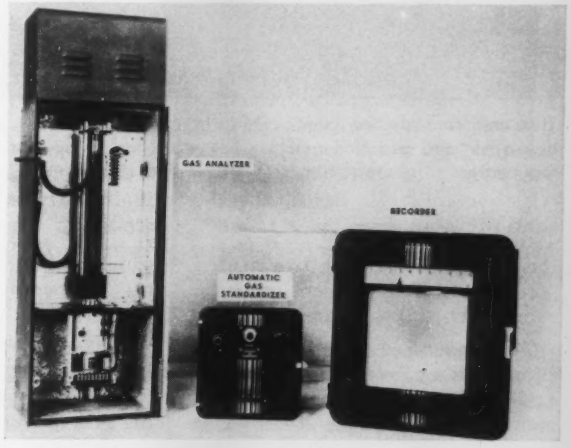
A sample at a regulated pressure passes into a mixing chamber through a fixed orifice. A constant pressure air supply also passes into the mixing chamber through another fixed orifice. After mixing,

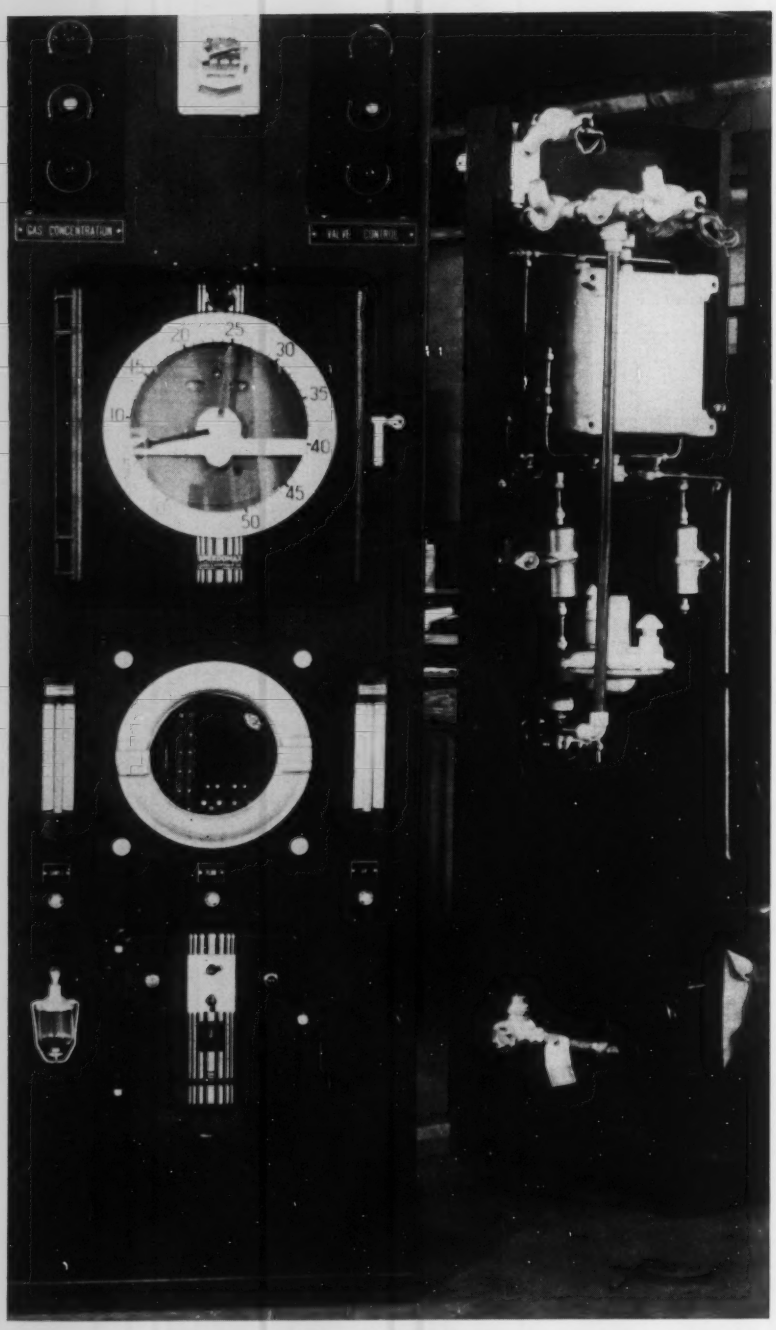
In the fourth section, the sample contains an additional gas—5 per cent carbon monoxide. This absorbs an equal amount of energy on each side of the thermopile and does not overlap the absorption spectrum of methane. There is no interference, and the recorder still reads 3 per cent methane.

In the fifth section, 2 per cent propane has been introduced as an interfering gas. This provides unequal absorption and the instrument now reads 4 per cent methane. It is in error by 1 per cent of methane.

To correct this, it is necessary to introduce pure propane into the filter cell, which absorbs all the infrared energy from both sides of the thermopile. The effect of the interfering gas compound is canceled so that the recorder again reads the correct value of 3 per cent. In a similar way, the interference effect of other gases can be eliminated.

On the right is a photograph of the equipment, with the recorder at the right and the analyzer at the left. An automatic gas standardizer is in the center. It may be used to standardize the equipment automatically against a standard gas sample at predetermined intervals.





This unit controls the combustibles in an atmosphere. Analyzing unit is between air and gas flowmeters. Lower control is operated by recorder at the top center. Unit regulates a valve in the gas supply

the sample flows over two heated platinum filaments where catalytic combustion takes place.

The amount of gas and air mixture passing over one of them (called the measuring filament) is many times greater than that which passes over the other (called the compensating filament). The purpose of the large amount of sample gas is to compensate for variations in thermal conductivity.

Both measuring and compensating filaments form arms of a Wheatstone bridge located in a standard recording unit. As the percentage of combustibles in the sample gas increases, the temperature of the measuring filament increases, raising its resistance. This is measured by the recorder as a percentage of total combustibles.

The control unit (left) regulates the position of a valve in the gas supply to the atmosphere generator. While the commonest range used is 0-10 per cent, units for total combustible ranges from 0-1 per cent to 0-50 per cent are available. Accuracies of plus or minus 0.25 per cent are claimed, and a sensitivity of 0.05 per cent is possible. Over-all response time is between 15 and 30 seconds.

Oxygen—There are other quantities which might be measured and are sometimes important.

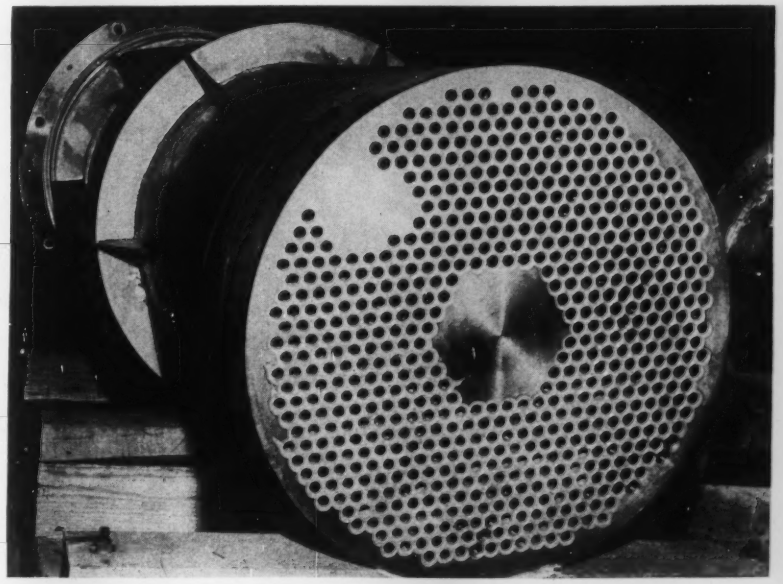
Oxygen in a gas should be known. Some analyzers use the paramagnetic property of oxygen—its ability to be drawn by a magnetic field. You can get them for ranges as low as 0-1 per cent with an accuracy of plus or minus 0.05 per cent and a sensitivity of 0.01 per cent.

Another type operates on the same principle as the combustible analyzers. Hydrogen is mixed with the sample gas. It combines with the oxygen in the sample when it passes over the heated platinum filament, producing a temperature rise and an increase in the filament resistance. This change in resistance is recorded as the percentage of oxygen in the sample.

Torque Resultant — Indicating and recording control analyzers which measure the total specific gravity of a gas sample are also available. In this analyzer, a rotating motor-driven impeller, revolving in a closed chamber, drives the gas against the blades of an impulse wheel located opposite the impeller in the same chamber (somewhat like an automobile fluid drive). This produces a torque on the shaft of the impulse wheel which is proportional to the specific gravity of the gas. This torque is transmitted to the pointer which shows specific gravity.

• *An extra copy of this article, and Part II which appears next week, is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*

Quality is the key to its successful use. Its resistance to chemical and radioactive corrosion makes it vital to nearly every atomic energy facility



Heat exchanger used for nitric acid recovery in nuclear energy installation. Type 304L stainless tubing is joined to tube sheet by melt-down welds

Role of Stainless Tubing in Atomics

By NORMAN D. GROVES
Corrosion Engineer
Carpenter Steel Co.
Reading, Pa.

STAINLESS pipe and tubing used in the atomic industry must be of highest quality.

Much of the process equipment becomes radioactive itself or contaminated with radioactive fission products. It must be handled remotely. Inspection to determine the nature and cause of a failure must be done remotely.

Costly—Failure of pipe or tubing in most chemical industries would be expensive because of replacement cost and lost production, but the failure of a similar part in an atomic energy facility may be several times as expensive.

It may cost as much as $3000 to cut a 6-in. section from a heat exchanger tube that fails. Sometimes, entire units must be replaced because individual sections cannot be maintained. Failure of a single pipe or tube could mean discarding equipment valued at $250,000.

Applications—Stainless pipe and tubing are a vital part of nearly every atomic energy plant. They are found in uranium ore refineries, metal purification plants, nuclear reactors, chemical separation plants and waste storage installations.

Primarily, the product is austenitic stainless. Carpenter's Alloy Tube Division, Union, N. J., makes several grades for atomic applications.

The steel must resist severe chemical corrosion or prevent the formation of radioactive corrosion products. It's used for fluid transfer lines, heat exchange equipment and fuel element coverings.

Corrosives—The chemical corrosion problems of the industry are severe. The corrosives vary from highly oxidizing solutions such as nitric acid or sodium dichromate to reducing solutions such as process fluids that contain large quantities of fluoride ion.

Many process solutions contain corrosive mixtures of metallic salts and free acids. Also, the thermal gradients created in the process equipment when the fluids are heated or cooled may cause stress corrosion.

Shielding — Extreme resistance to corrosion must be provided in such pieces of equipment as nuclear reactors in which the coolant is contained in areas that have minimum radiation shielding. One fluid handled by stainless pipe and tubing is pure water at temperatures up to 750°F and pressures up to 2000 psi.

Under such conditions, the material of construction must have maximum resistance to corrosion to keep the radioactive corrosion products from collecting in sufficient quantity to require additional shielding.

In some reactor systems, the added shielding would make the

Carpenter nondestructive test equipment inspects inner and outer diameters, wall thickness, chemistry and tolerance of austenitic stainless tubing. Test covers entire length and periphery of each tube

reactor unusable or prohibitively expensive. This situation is especially critical when the shielding is to guard against the accumulation of radioactive corrosion products and fission fragments in areas of restricted flow.

Materials—Most commonly used stainless pipe and tubing are Types 304L, 316, 347 and Carpenter Stainless 20. Some are best for oxidizing conditions, others for reducing conditions. Pipe and tubing of Zircaloy, aluminum, nickel, Inconel and Hastelloy B and C also are used.

Factors that determine the ultimate service life of the material begin with the mill product. Knowledge of the end use gives the manufacturer a more accurate basis for producing it. Complete testing, quality control and inspection are essential.

It is wise to check each operation on the stainless pipe and tubing during manufacture, fabrication and installation to assure maximum service life of the finished equipment.

Tests—For critical applications, the product should undergo a number of tests. In some applications, ultrasonics, eddy current and x-ray tests should be used in combination to check for voids and laminations before and after fabrication.

Corrosion tests should be used to determine which tubing and pipe are best for critical applications. They include such standards as the boiling nitric acid, acidified copper sulphate and high pressure steam tests, plus specials such as velocity loop tests.

Types — All things equal, both welded and seamless tubing will serve the purpose if they are high quality products. But much of the tubing is fabricated by welding. It is best to use an alloy composition that is intended to make the steel readily weldable.

Most tubes for heat exchanger applications are welded to tube sheets without filler metal. To prevent shrinkage cracking in the weld, it's necessary to carefully balance the compositions of certain stainless alloys.

Both welded and seamless tubing, properly manufactured, give uniform strength characteristics for the length of the tube. Both are suitable for pressures covered by the ASME Boiler Code. Pressures normally encountered range up to 2000 psi for reactor process tubing and for heat exchanger tubing in primary coolant systems.

Welding—Tubular assemblies for nuclear uses are welded, formed and machined. In some cases, when design of the assembly is unusual, the fabricator must develop techniques for working the metals.

Welded assemblies require the ultimate in weld quality. A flaw, no matter how infinitesimal, could be ruinous. In welding joints and seams, avoid or at least minimize weld craters. Where possible, solution anneal the finished structure to relieve stresses and dissolve precipitated carbides and similar elements.

Forming—The techniques of forging, swaging and tube reducing tend to keep segregates along an axial plane in the part and increase its resistance to corrosion. It pays to use tube reducers for joining sections of pipe with different diameters.

Special tolerances are the rule. In most cases, commercial tolerances are barely adequate. Generally, you have to match or exceed the quality of hydraulic tubing for critical applications.

Critical or Not?—It is vital, especially from the standpoint of cost, that some distinction be made between the critical and noncritical in material specifications. Those entering the field tend to overspecify, demanding extremely close tolerances where they are not required.

Tolerances must be regarded realistically. Nothing more than necessary should be asked.

Fuel Elements — Probably the tightest restriction is made on the ovality requirements for tubing used to hold clad fuel elements in the reactor. The fit between the bar of uranium and the tube is critical. The ovality of the tube is vital because it provides an annulus between the tube and the cladding through which water must flow and cool at a uniform rate.

For best results in all respects, work closely with the manufacturer of the stainless pipe and tubing. If he fully understands the conditions under which the finished tube will operate, he is better able to produce exactly what is needed.

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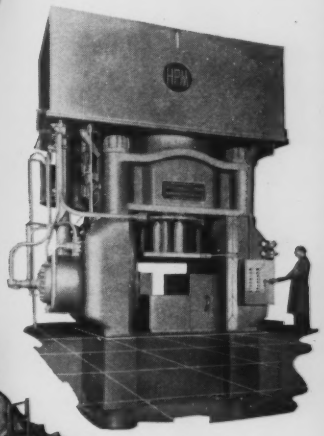
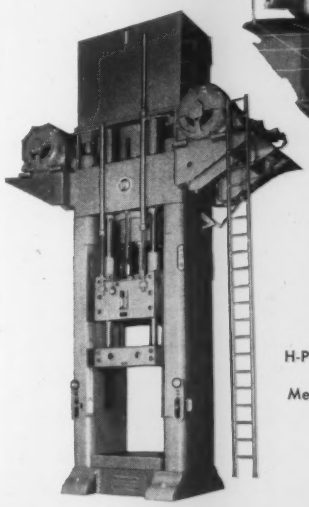
HPM

80 YEARS BUILDING A TRADITION



H-P-M Metalworking Titanium Briquetting Press



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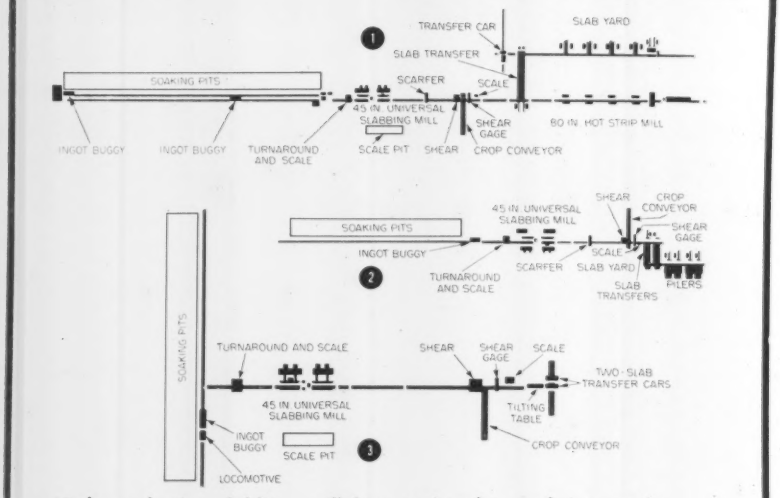
1877—1957

Demand for high production and big slabs gives it the edge over other ingot-breakdown types in new installations



High production slabbing mill layouts (numbers refer to text)

Comeback for the Universal Mill

THE UNIVERSAL MILL seems to be coming back into favor. Since the war, about 15 mills (primarily for slab rolling) have been built in this country. Only a small fraction were universal mills. But another six mills are on order, and five of them will be universal mills.

One big reason for the changing trend is the peak demand for slabs which are converted into strip and plates, H. J. Kalberkamp, chief engineer, Mesta Machine Co., Pittsburgh, told the spring conference of Iron & Steel Engineers, Cincinnati, Apr. 23. A modern universal mill can produce 4000 tons of slabs during an 8-hour turn, he said.

Backing—To meet that production, about 4700 tons of ingots must be brought to the mill, and (in addition to the slabs produced) about 700 tons of crops and scale must be taken away. Obviously, mill auxiliaries must be scaled to keep pace.

Three separate layouts designed for high production are illustrated above. The first (Fig. 1) is in a plant laid out on a new site for maximum ultimate capacity.

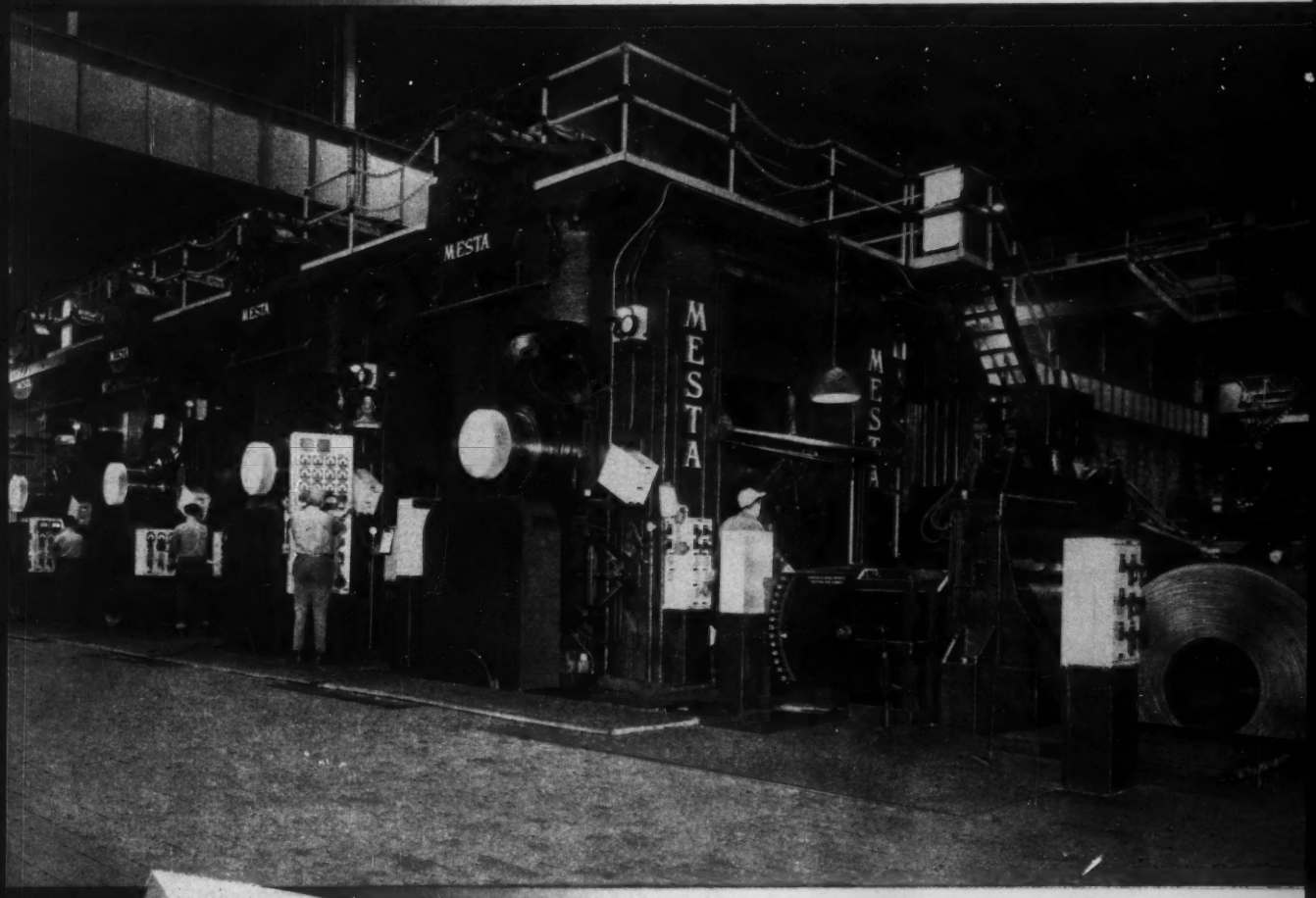
At this plant, considerable tonnages of strip are rolled directly from slabs without reheating. Although this means more difficult scheduling, the soaking pits, slabbing mill and hot strip mill operate as a unit. Two rope-driven ingot buggies deliver the ingots on edge to the ingot receiving tables.

Another—The mill illustrated in Fig. 2 produces slabs primarily for

Which Mill for Slabbing?

	High Lift Mill	Universal Mill
Slab width	Up to 60 in.	Over 60 in.
Initial cost	Least	Most
Maintenance	Least	Most
Visibility	Most	Least
Bloom rolling	Can be done	Cannot be done
Production rate	Least	Greatest
Manipulator wear	Most	Least
Edging passes	Can be made with full mill power, but require a separate pass	Power limited by capacity of vertical drive, but pass made at the same time as horizontal pass

HIGH SPEED COLD MILLS



Mesta 80" Four-High, Four-Stand Tandem Cold Mill

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for Fairless Works, U. S. Steel Corporation

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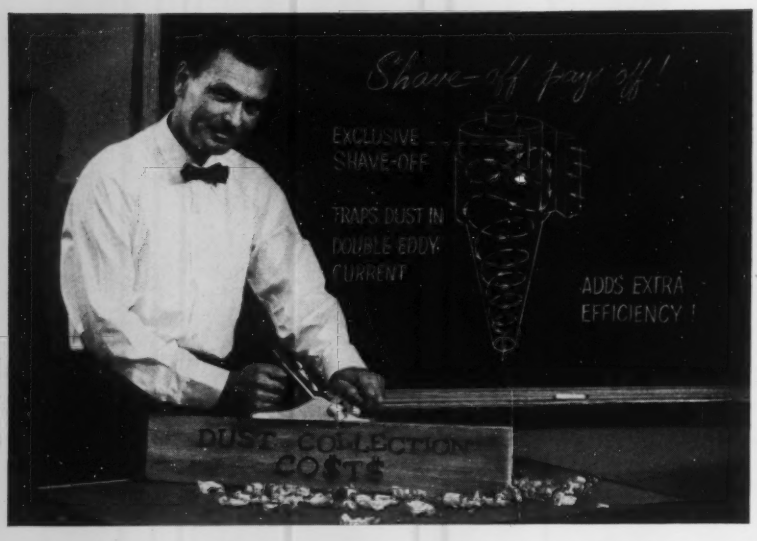
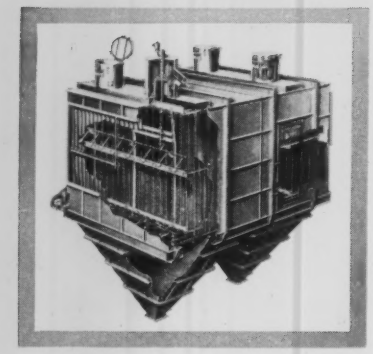
MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA

How Buell's exclusive Shave-off pays off in extra dust collection efficiency





Buell SF Electric Precipitator also delivers extra dust collection efficiency, due to unique Spiralectrodes and Continuous Cycle Rapping.

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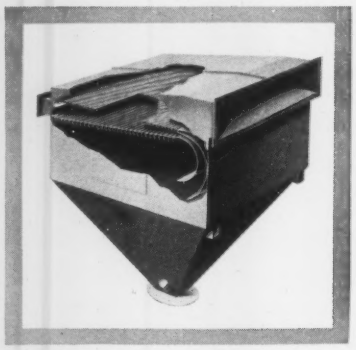
Proper proportioning, side entry of dust-laden gases, add even more extra efficiency and long, maintenance-free life to Buell Cyclones. Large diameter design eliminates bridging and clogging, keeps efficiency high under varying loads.



For more specific data about Buell's *extra efficiency*, write Dept. 26-F,
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DUST COLLECTION SYSTEMS

UNIVERSAL MILL . . .

a 96-in. hot strip mill which is some distance away. Island-type soaking pits are in line with the mill building. A self-propelled buggy conveys ingots to the receiving table.

All the product is delivered to a slabyard parallel to the mill building, keeping the mill aisles clear. The transfer arrangement makes the sheared ends of the slabs accessible for stamping.

Building—A mill under construction will have the layout shown in Fig. 3. Arrangement of the soaking pits at right angles to the mill makes for short ingot buggy runs and permits more than one buggy to be used on the same track. The buggies are pulled by a locomotive.

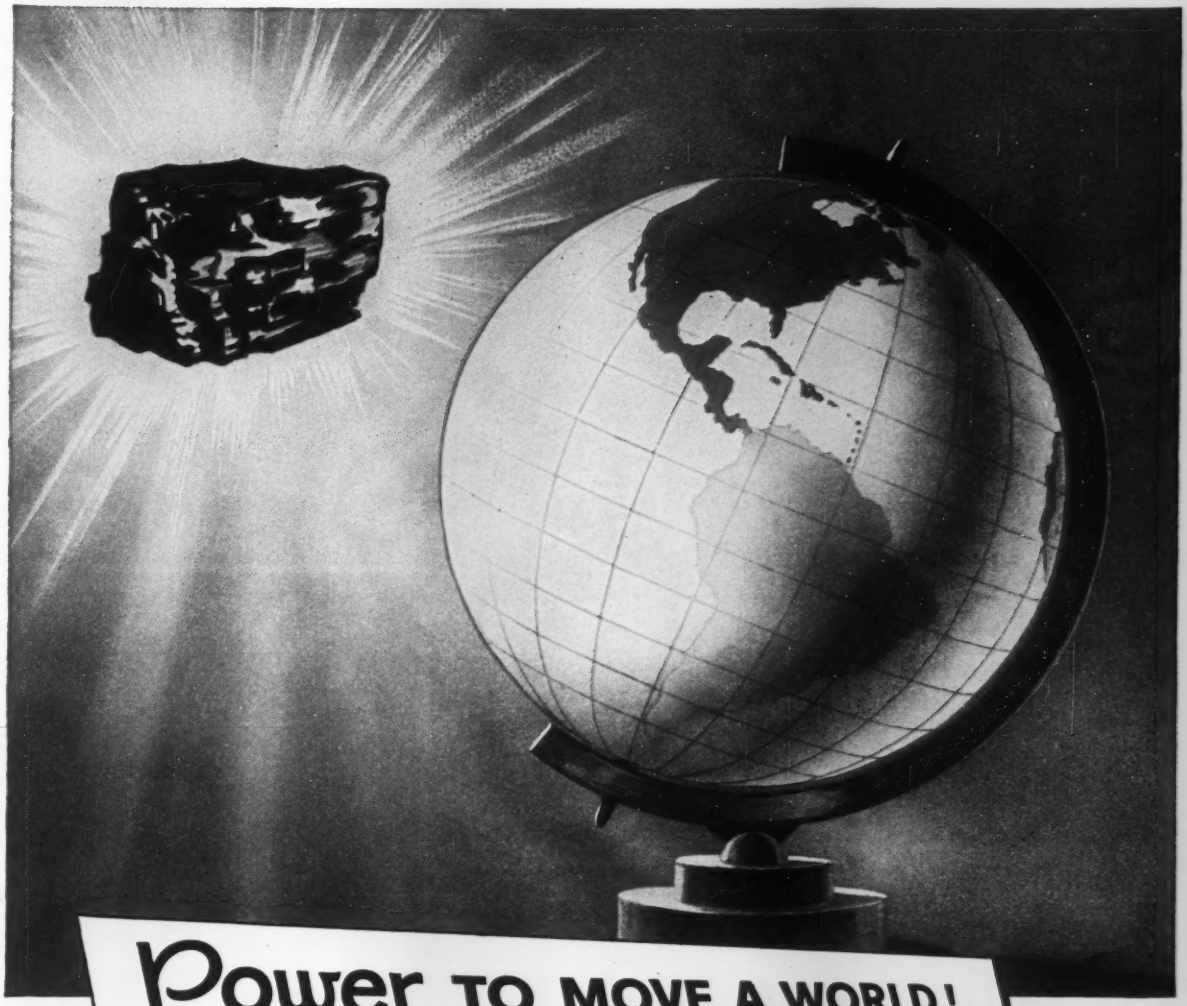
In each case a different ingot buggy was chosen to meet plant conditions. The rope-driven buggy is fast (1000 fpm max), but it is out of control if the rope breaks. The self-propelled buggy is under full control at all times but requires a collector system. The third requires a locomotive but is under constant control. It can be coupled with other buggies and can transport ingots from a second set of pits.

High Lift—While high production and improvements in design make universal mills a logical choice in these examples, there are times when a high lift, 2 high mill is to be preferred. Some of the guides for choice, detailed by Mr. Kalberkamp, are outlined in the table on page 146.

About 25 or 30 years ago, most slabbing mills built were of universal type. Difficulties encountered in direct gearing of the vertical rolls and the intricacy of roll changing techniques were among the reasons they lost out to the high lift mill.

Modernized—The new universal mills designed by Mesta have a vertical roll drive through spindles with universal couplings. This permits gearing the drive on average opening rather than minimum opening centers, allowing much larger gears.

A reduction in passes is one of the features which gives the universal mill greater production capacity than the high lift type. The wear on manipulators is also less.



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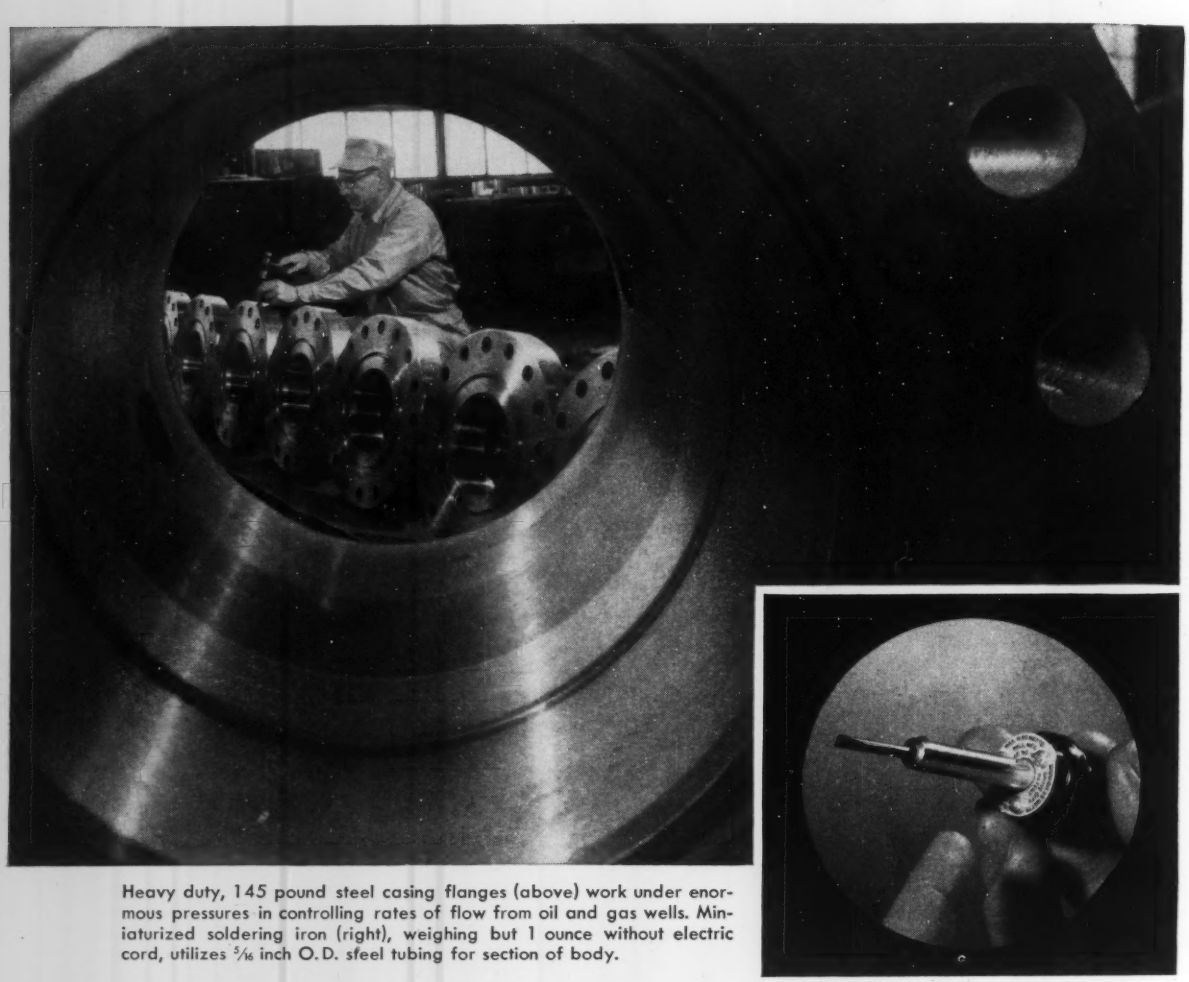

Heavy duty, 145 pound steel casing flanges (above) work under enormous pressures in controlling rates of flow from oil and gas wells. Miniaturized soldering iron (right), weighing but 1 ounce without electric cord, utilizes 5/16 inch O.D. steel tubing for section of body.

One channels a torrent...one carries a current Columbia-Southern Trichlor vapor degreases both

Vapor degreasing is cleaning more parts, more assemblies in more metals plants every month . . . and doing it with an economy and low-reject efficiency unmatched by older cleaning processes. Vapor tank units, conveyorizing equipment and solvents have all improved tremendously over the past several years. And nowhere is the kind of improvement that makes vapor cleaning the ideal process seen more clearly than in Columbia-Southern's exclusively developed, neutrally stabilized Trichlorethylene.

This unique stabilizer, completely different in chemical composition from the highly alkaline amines used in many other solvent formulations, keeps pH high for extremely long periods. Users experience no parts corrosion due to solvent decomposition under light, heat, oxygen, acids, moisture, repeated distillation. You get more actual degreasing from each drum of Columbia-Southern Trichlor. And you'll find it a more versatile solvent, too. Chips, grinding and buffing compounds, graphite, grease, coolants, quenching and lubricating oils are removed almost instantly from materials and parts as dissimilar as those pictured above. Parts emerge clean, dry, ready for immediate inspection, further machining, painting or plating.

Columbia-Southern Trichlor wins the nod from both purchasing and operating standpoints. The solvent's nonflammability, high vapor density and low boiling point allow less waste, more safety. Made to the most rigid standards of controlled quality by one of the world's leading merchant producers of chlorine, Columbia-Southern Trichlorethylene helps you realize all the advantages of the vapor degreasing process.

Take your choice of tank car, tank truck, or drum delivery . . . the Columbia-Southern identification brings you uniform quality with each shipment. Order or re-order today from the nearest Columbia-Southern sales office or from your solvents distributor.

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IN CANADA: Standard Chemical Limited and its Commercial Chemicals Division

Finger-Tip Inventory

AN IBM-650 electronic computer is being used by Crucible Steel Co. of America, Pittsburgh, to get centralized inventory control over 16,000 specialty steel items. They are stocked according to geographical demand in a coast-to-coast warehouse sales system.

In effect, the computer converts this enormous variety into a single stockpile, enabling the company to reach higher efficiency in serving warehouse customers.

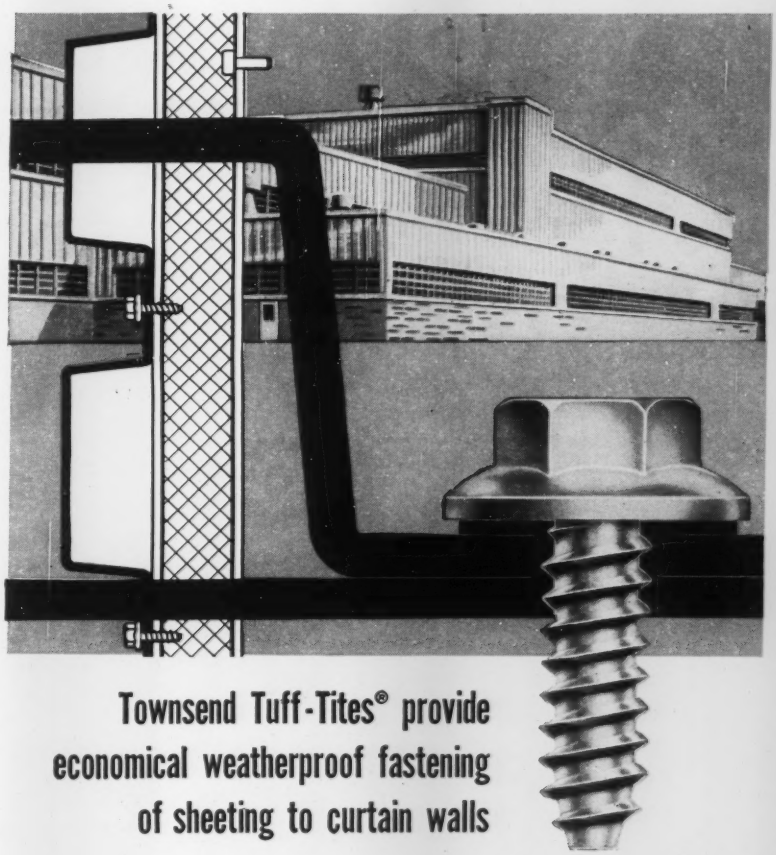
Quick Check—George W. Stamm, general manager of sales, says: "Some 85,000 records are updated twice each week, giving us a detailed current inventory of stock at 28 warehouses. We can tell quickly what items are on order and where those in transit are."

Data processed by the computer are recorded on magnetic tapes which become a record for the entire warehouse system. Other data are recorded simultaneously on punched cards and on stock status cards for filing. The accumulated data are available to all sales offices through an AT&T Teletype circuit, which can answer customer queries moments after they are received.

Seventeen types of transactions can affect the magnetic file. They include sales, receipts of steel, stock orders from warehouses, interbranch shipments and new stock items. Some 100,000 cards are processed each month to bring these transactions up to date on the tapes.

In the future, Crucible plans to use the computer to improve mill customer service, production scheduling, research and engineering and routine accounting.

Inventory control at Crucible's electronic computer center in Pittsburgh



Townsend Tuff-Tites® provide economical weatherproof fastening of sheeting to curtain walls

Townsend Tuff-Tite fasteners provide weatherproof fastening of exterior sheeting to insulated panels used in curtain wall and roof construction. Leakage is eliminated by the Tuff-Tite's integral undercut hex head and washer construction and by the pre-assembled conical shaped neoprene washers which fill the holes.

An outstanding application of Tuff-Tites in curtain wall construction is the "A" panel made by Elwin G. Smith & Co., Emsworth, Pa. These panels are made with a number of different surfaces and have been installed by Elwin G. Smith on buildings in varying climates from New England to Texas.

Tuff-Tites are available in both stainless and carbon steels in a number of types and lengths. They are equally suitable for crown or valley fastening because of their excellent sealing qualities and may be used with aluminum, galvanized steel, stainless steel, protected metals, fiberglass plastic or asbestos siding and roofing.

For more information on these economical, weatherproof fasteners, write to Townsend Company, P.O. Box 237-C, New Brighton, Pa., asking for Bulletin TL-107a.

See Tuff-Tites Demonstrated At The Design Engineering Show—Booth 1139

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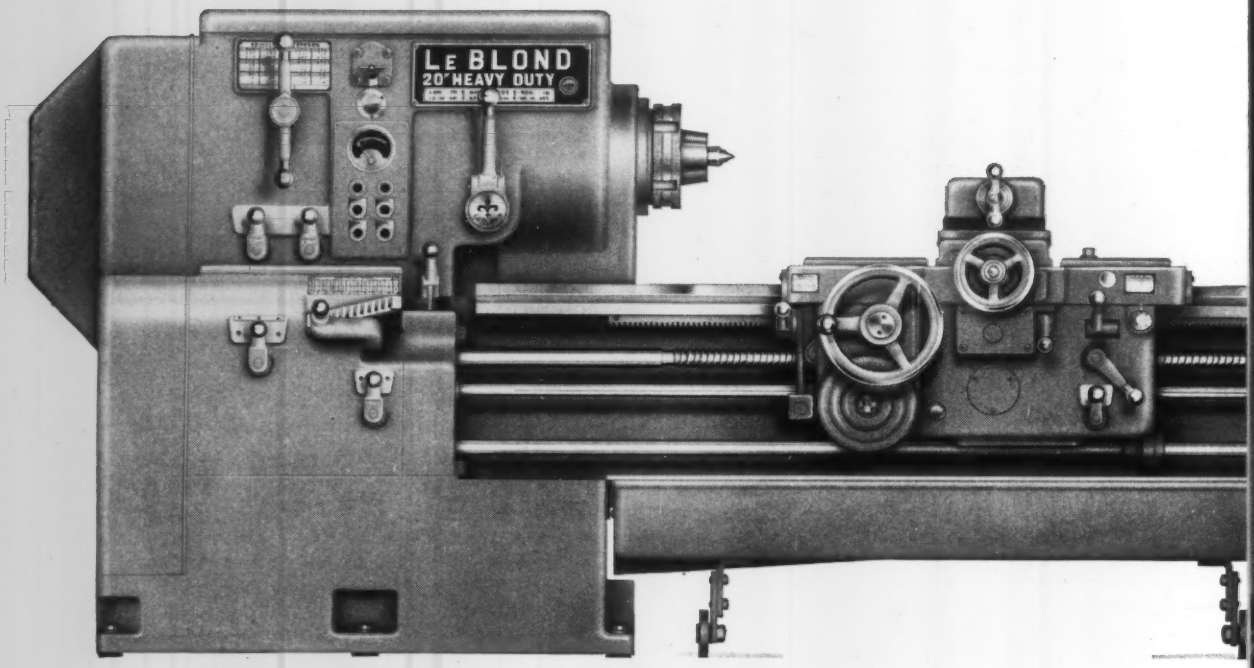
20" Heavy Duty

power and toughness to use all the



The new LeBlond 20" gives you all the rugged design and construction of the toughest heavy duty turning machines in the world. Power, rigidity, stamina—dramatic new features and new human-engineered operator convenience. Here's why you'll want LeBlond 20"s fighting the production battle on *your* side!

Smooth, usable 40 H. P.—to get the most from today's advanced tools! In the headstock, extremely short, heavy shafts and fine-pitch precision-ground gears deliver power efficiently to the spindle—with minimum no-load horsepower. Plenty of power at lowest speeds, too! For example, *at 10 rpm you can take a cut as deep as ½" in 16" diameter work, feeding at .063 ipr!*

36 high-power speeds. Selections made in fine increments, particularly in the low range where small differences in rpm make big differences in tool life. 36 speeds, 10 to 1300 rpm in geometric progression. The tough, forged spindle is supported in 3 places by 5 bearings. DC speed selection at apron available with simplified gearing in head.

All-new 2-speed tailstock. Tailstock spindle travel is geared for conventional and low speed. When drilling, for example, push handle *in* to drill at slow, powerful feed; pull handle *out* to retract quickly. Tailstock can be moved by power. Exclusive LeBlond worm and rack construction puts handwheel at a convenient angle to the operator, provides exceptionally long travel and positive safety lock against thrust. Full-length support of spindle, even when extended.

Scientifically planned operator convenience. Human-engineered for operator convenience, the controls of the

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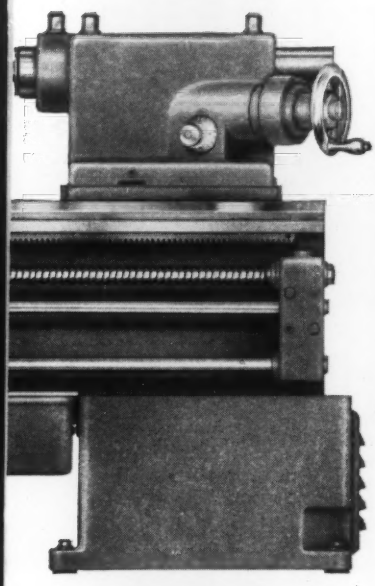
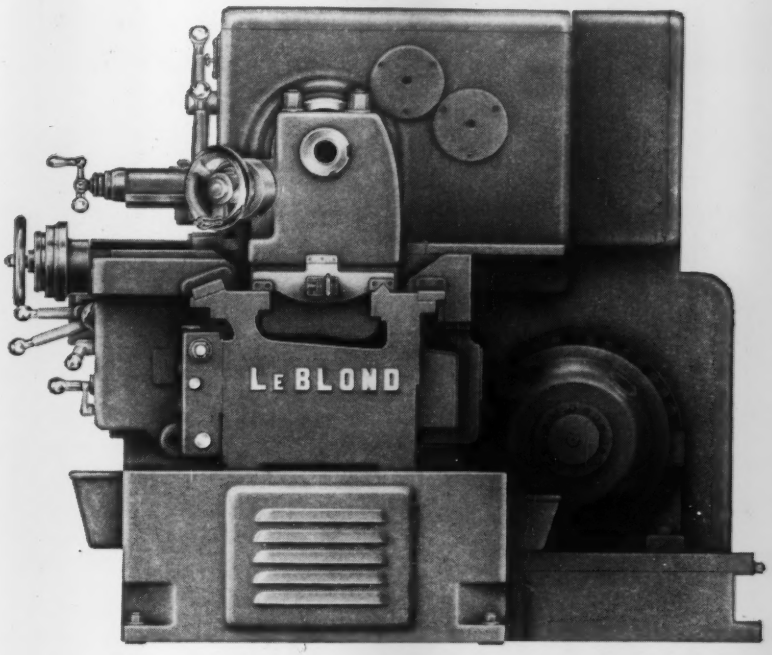
Engine Lathe

bite of today's ceramics and carbides!





new LeBlond 20″ were scientifically studied for shape, size and location. To simplify speed and feed selection, levers are always moved toward operator position for increase, away for decrease. Speed selection is color coded. Spindle is sensitively controlled by means of electric clutch and brake. 4-directional power rapid traverse controlled by single lever. In addition, built-in horsepower meter, chasing dial integral with apron and quick-setting diameter reading dials on crossfeed.

Many famous LeBlond features. Hardened and ground replaceable steel bedways with compensating vee-way design, automatic lubrication to head, quick-change box, apron, single-shot to tailstock, hardened and ground crossfeed screw with compensating nut, one-piece apron, flame hardened rack, totally enclosed quick-change box.

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Call your LeBlond Distributor or write for complete specifications.

LeBLOND *of Cincinnati*

THE R. K. LeBLOND MACHINE TOOL COMPANY

Cincinnati 8, Ohio

Small stamped parts are loaded on them for transfer to a surface grinder's magnetic chuck. The simple system cuts machine load and unload time to a minimum

The grinding machine operator lowers a part board onto the magnetic chuck. Loaded boards are stored in the racks in the background. The small photo at the left shows the line of three grinders where the system is used

Greased Boards Whip Machine Bottleneck

ENGINEERS at Teletype Corp.'s Touhy avenue plant in Chicago had a problem: How to save time getting work into and out of three, vertical spindle, Mattison surface grinders.

About 200 types of small steel stampings are finished to close tolerances on the grinders. Production schedules called for thousands of parts daily, but the operation didn't lend itself to speed. Normally, it went like this:

Operator positions parts on magnetic chucks, grinds them, stops machine, removes parts.

Solution — Teletype engineers went at the source of down time: Positioning and removal. Greased boards (the small parts stick to them) proved to be the answer.

The system has these advantages over the previous one: It involves less down time; it is cheaper because relatively unskilled labor does much of the operation; and it is better because parts can be loaded while the machines are running.

Here's how the system works:

Sequence—Stamped parts come directly from the presses to the grinding department. Girls place about 100 on each board.

The operator turns the board upside down, and the parts are removed and held in place by the magnetic chuck.

When the parts are finished on one side, the chuck is demagnetized; the board is placed over the parts, and they are removed.

The board is returned to the loading line, where the girls turn the parts over so they can be finished on the second side.

Each machine now finishes 3000 to 6000 parts during each shift.

WAGNER ISO-BRITE COPPER . . .

"The efficiency of your new Iso-Brite Copper bath will enable us to put a $7500 'semi' to work on other jobs. We get a deposit of .0005" in a 15 minute cycle and could easily get .0006" to .0008" if required. Iso-Brite needs less maintenance than any bath within our experience." (Robert Hilfinger, Pres. Hilfinger Corp. to Jos. R. Wagner.)

Die cast automotive grill part ready for nickel and chrome.

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CONVERSION TO ISO-BRITE ELIMINATES ONE MACHINE . . .

The record at Hilfinger Corp., Toledo, Ohio, tells a simple story. This big, 115,000 sq. ft. die casting plant with a 200-man plating department originally required two semi-automatic plating machines for plating copper before nickel and chrome on large automotive die castings. New Wagner Iso-Brite Copper bath was installed eight months ago in one tank, replacing a leading proprietary copper bath, both machines being operated by a single generator. Excessive burning of the competitive plate resulted. The single machine charged with Wagner Iso-Brite Copper now turns out Hilfinger's entire production requirement to the customer's specification, permitting the surplus semi-automatic to be devoted to other production.

If reducing finishing costs is of interest to you, consider these reasons why this new Wagner-processed chemical is making records everywhere:

Wagner Iso-Brite Copper offers

1. Ease of control
2. High anode efficiency—copper cyanide additions virtually eliminated
3. Much heavier plate
4. Fine grained, dense, ductile, fully bright
5. Freedom from roughness
6. Wide operating range—temperature 135-165°; up to 60 amperes per square foot
7. High tolerance of organic contamination

Wire, phone or write for Bulletin 70.2 for full technical information on Iso-Brite Copper and the Wagner cadmium and zinc brighteners and chromate finishes. Please pass this advertisement along to your purchasing agent or plating superintendent. The Wagner man in your area will assist you with any plating problem.

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Removable manifold
Entire manifold removes in seconds—without tools!
Hinged water curtain
Swings up for easy skimming of entire collecting pan.
Complete water circulation
No dead ends to accumulate sediment.

Binks Style "E" Dynaprecipitor Water Wash Spray Booth

Built for easy maintenance
Manifold and front water curtain come out in seconds—without tools! Simplifies clean-up of manifold, upper wash chamber, rear water curtain and rear exhaust chamber. Hinged water curtain permits skimming of entire collecting pan without dismantling booth!

Built for low maintenance
Curved wash chamber surfaces prevent paint build-up. Complete water circulation system has no dead ends to accumulate sediment.

Needs less floor space
New design shortens depth of wash unit. Never before a booth with such maintenance ease.

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Sheet Metal Dies

Here's a formula for casting harder, longer lasting zinc based die material

GMOODIE is a low cost, zinc base die material that is saving money for General Motors Corp.

The auto maker has used more than 1 million lb of material, J. C. Holzwarth, supervisor, Metallurgical Engineering Department, and S. Menton, manager, Manufacturing Staff, Overseas Operations, reported at the recent SAE National Production Meeting in Buffalo. Here are some of the results they gave:

- Gmoodie dies outwear conventional zinc base tools about 4 to 1 in forming 18-gage, cold-rolled steel.
- For light draws, they can form up to 200,000 pieces. (Moderately heavy to heavy service reduces that figure.)
- Die cost is between one-fourth and two-thirds that of ferrous dies.
- 95 per cent of the die material can be reclaimed.

Composition—The material is a zinc base alloy:

Aluminum	4.0%
Copper	3.25%
Magnesium	0.15%
Nickel	0.80%
Titanium	0.20%

Balance zinc

Nickel and titanium form hard intermetallics in the zinc matrix, which are probably responsible for the wear reducing qualities. The embedded particles have a hardness measurement of 700 to 1000 Diamond Pyramid, compared with the base alloy hardness of 100 to 110 Brinell.

Costs — Gmoodie costs 1.5 to 2 times as much as conventional zinc base materials. Messrs. Holzwarth and Menton feel that comparative costs are substantially the same if the original cost of the metal can be regarded as a capital investment and amortized through a number of tools. Depreciation from recasting need not exceed 10 per cent.

Many studies have shown that the cost of a zinc base die is between 25 and 70 per cent of that of a ferrous die. You can deduct from that the savings of shorter

making history or moving mountains...

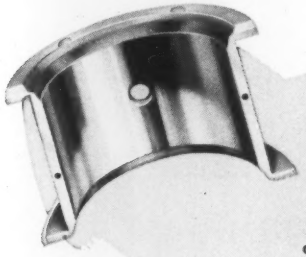
BOHN parts . . . always dependable

Photo Courtesy Warner Brothers' "*Spirit of St. Louis*"

1927 Solo . . . New York to Paris . . . 33½ hours . . . non-stop. Lindbergh's epic achievement focused world attention on an infant industry . . . and aviation surged into a new era of progress.

BOHN BEARINGS, in the 225 H.P., 9 cylinder engine, functioned unfailingly throughout this history making flight.

1957 Today, 30 years later, Bohn still makes dependable bearings . . . still pioneers in the development of better parts for all industry. This mammoth crawler tractor moves mountains . . . does the *big jobs easily*. Bohn *aluminum-on-steel bearings* and *heavy-duty aluminum pistons* are vital parts of the 320 H.P., diesel engine powering this 30-ton giant.



Bohn Aluminum-On-Steel Bearings . . . available in a wide range of thicknesses. Recommended for light or heavy-duty applications. High fatigue resistance, handle loads up to 10,000 psi. Non-corrosive, usable with all types of shafts.

Bohn Heavy-Duty Aluminum Pistons . . . give positive bond with iron or nickel alloy inserts. Improve engine performance by eliminating top ring-groove wear and reducing oil consumption.

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THREE TYPES of 22-B Cranes Answer THREE Handling Needs

PROBLEM: Crane needed to handle lifting assignments in widely scattered locations; must have good mobility and long reach.

SOLUTION: **Bucyrus-Erie 22-B Transit Crane,** combining heavy-duty features with rubber-tired mobility, handles booms 30 feet (standard) to 80 feet (with removable inserts), has lifting capacity of 25 tons. A Transit Crane moves from job to job fast and, on reaching the job site, is ready to go right to work. Extendible outriggers provide a sturdy foundation.

PROBLEM: Crane needed for precision lifting, sometimes in locations where the ground is soft or rough.

SOLUTION: **Bucyrus-Erie Heavy Duty 22-B,** specially designed for jobs that require extra precision and stability, is the answer here. Long, flat crawlers with 30-in. treads keep the machine stable and maneuverable even on soft or uneven terrain. Friction swing brake and power boom hoist with power controlled lowering for the main hoist line permit delicate positioning of loads.

PROBLEM: Crane needed to handle a variety of work under all kinds of working conditions with minimum downtime.

SOLUTION: **Standard Bucyrus-Erie 22-B crane** with 35-ft. boom extendible to 70 feet provides reach needed for high lifts. Sturdy crawler mounting assures good stability and high maneuverability. Independent power boom hoist and responsive controls permit accurate placement of loads. The result is dependable service from the easiest to the toughest jobs.

Bucyrus-Erie 22-Bs can help you save money through efficient, long-term service. For complete information on any or all of these models, see your local Bucyrus-Erie distributor today, or write direct.

374E57

BUCYRUS ERIE

BUCYRUS-ERIE COMPANY
South Milwaukee, Wisconsin

SHEET METAL DIES . . .

preparation: General Motors cites an example of a three-piece draw die which required only 5 man-hours to prepare.

Limitations—For maximum performance, it's best to avoid sharp edges and small radiuses. The material resists rubbing wear quite well, but it is no harder than cold-worked sheet steel. You can expect plastic flow of the die alloy where unit loading is high.

Wrinkles can also cause considerable damage. Steel inserts help solve the problem.

Sheet steel must be prepared more carefully for Gmoodie than for hard dies. Edges must be free of burrs. Dirt must be removed. A good lubricant should be used on nearly every sheet. General Motors likes flake graphite, particularly for the break-in period.

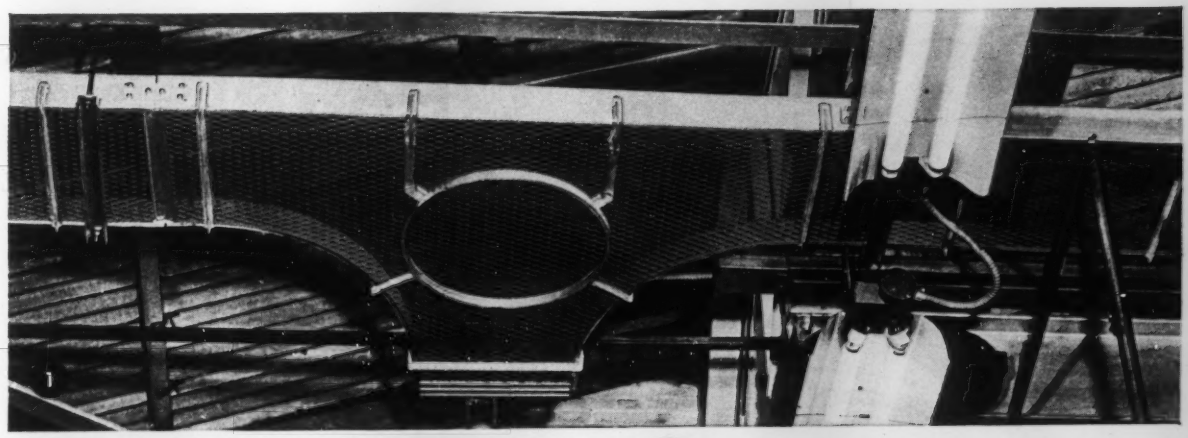
Choice — The selection of Gmoodie or iron depends on the production run. Severe forming of 30,000 to 60,000 parts usually requires a hard ferrous die. The zinc-type material is a good choice for light forming between 100,000 and 200,000 pieces. It is possible to make up to four zinc base dies for less than the cost of a hard iron die, since patterns are already available.

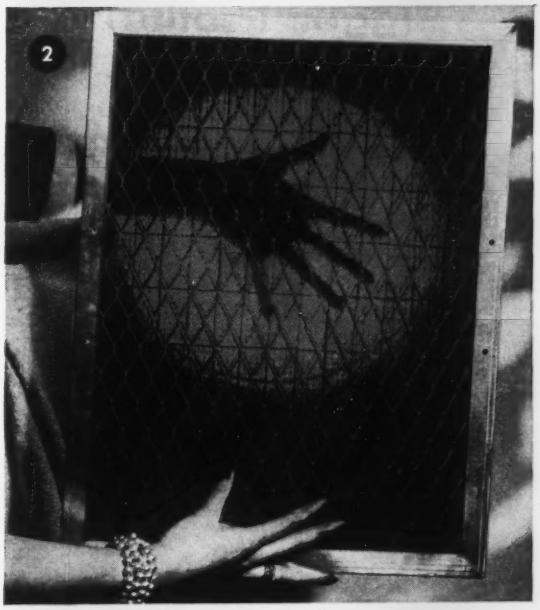
The shrinkage value of Gmoodie is about 7/64-in. per ft. As long as you use precise patterns and good foundry techniques, little labor or machining time will be needed to finish a die. Sides must be squared to remove the pattern draft and to provide flat and parallel bearing surfaces. Casting faces may be finished with abrasive discs, cup wheels and files.

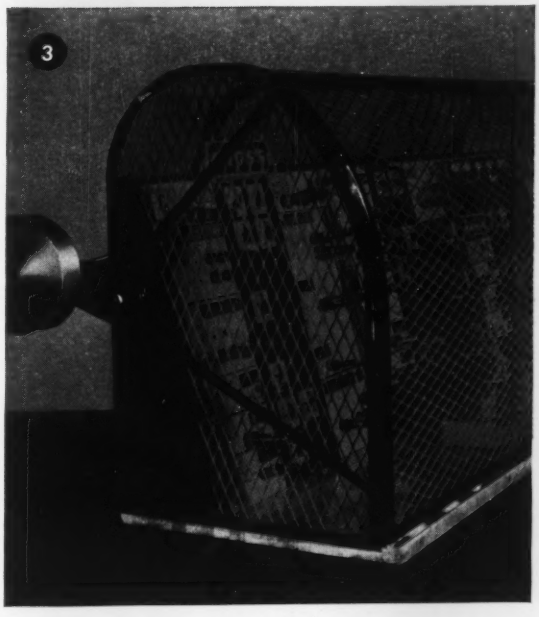
One of the useful maintenance features of the zinc alloy is that it can be puddled with a torch to build up worn areas.

Design Award

THE person who has made the biggest contribution to the advancement of stamping during 1956 will receive the annual Presteel Award. Nominations are being sent to Pressed Metal Institute, Cleveland. The winner will get a trip to Bermuda and a trophy which will be awarded at the annual PMI banquet.







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1. High strength, low weight and economy for cable basket—a product of Husky Products, Inc., Cincinnati, O.

2. Corrosion-resistant grille for permanent heating or air-conditioning unit filter—made by Hadley Products Co., Inc., Marietta, O.

3. Strong, open-mesh guard for control and tool panel —Cross Company, Detroit, Mich.

Many products like these have proved successful because their designers took advantage of the valuable properties of Penmetal expanded aluminum.

Up to 80% lighter per square foot than the original sheet, yet fully as strong, Penmetal expanded aluminum can help you design lighter-weight products that will last longer. Its corrosion resistance means durability; sustained clean appearance. Its open mesh permits free passage of light, air and water. What's more, this handsome mesh is easy to weld and surprisingly low in cost.

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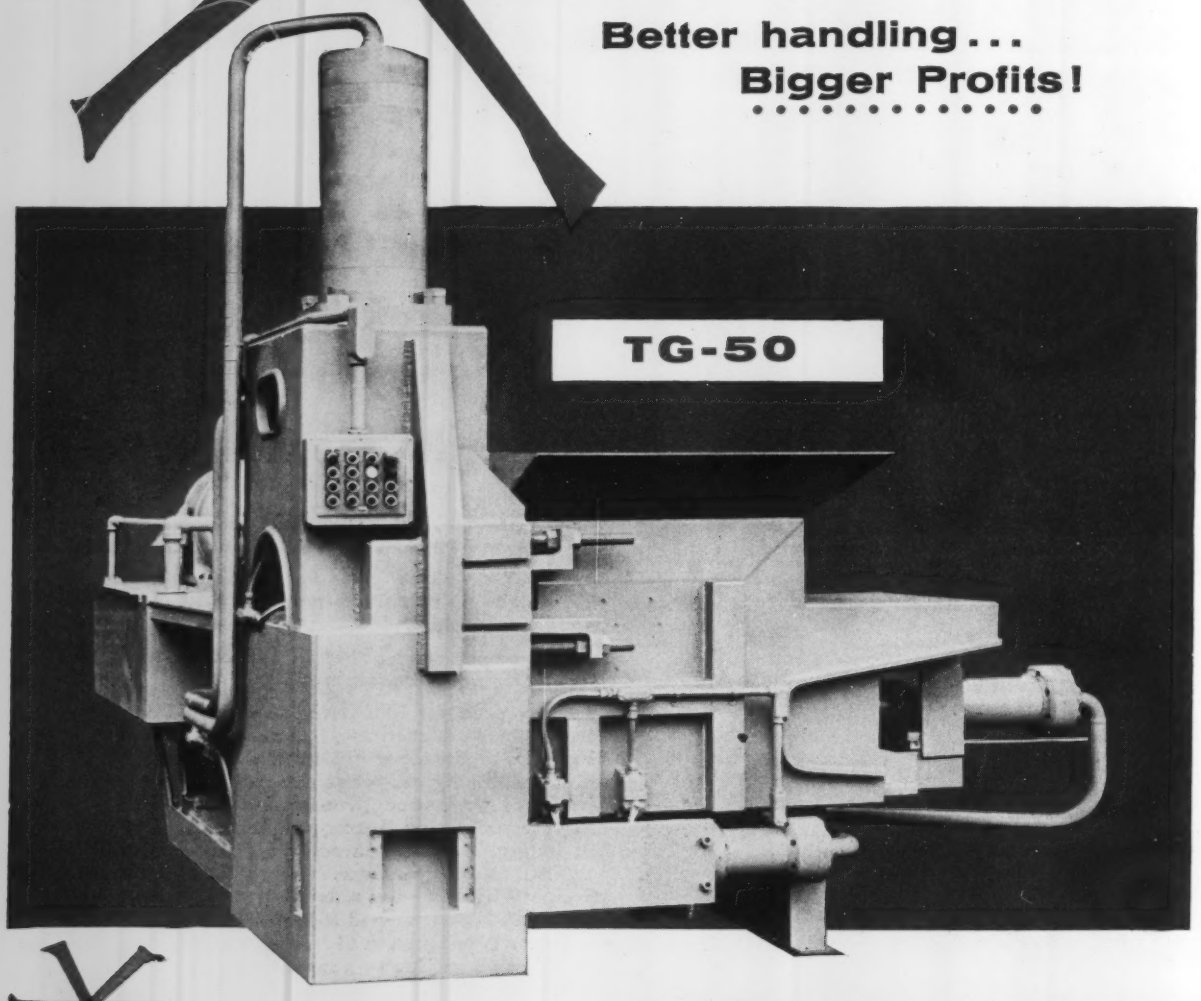

The new Harris TG-50 Baler is designed especially for baling materials uniform enough for conveyor type feeding. All bales measure 8″ x 8″ x variable length, and can be made at a rate of 120 bales of non-ferrous materials per hour. This press sits on top of the ground and can be moved with a minimum of effort.

Talk with a man from Harris

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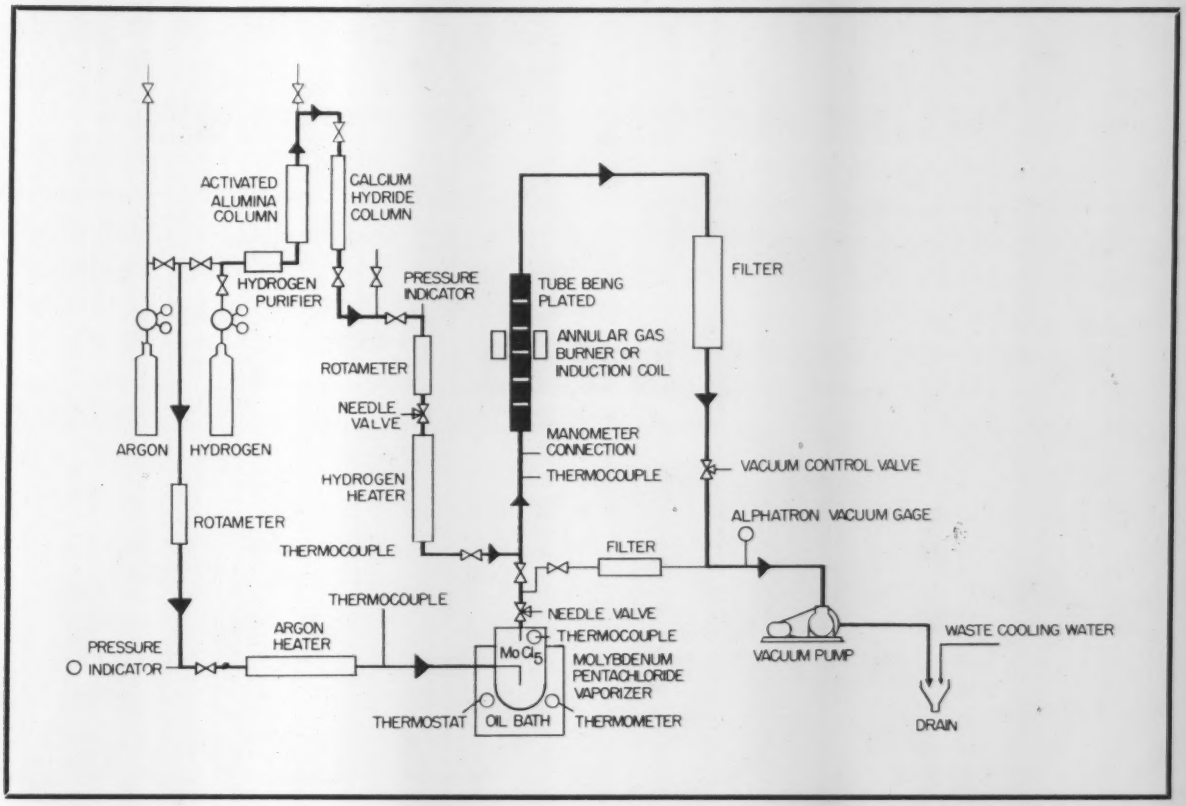


Plating Steel with Molybdenum

An experimental system for reducing molybdenum pentachloride promises to benefit equipment makers. It produces pure metal surfaces which are heat and erosion resistant

USING the system shown above, you can produce a relatively heavy (0.004 in.) plate of molybdenum on the inside of tubes.

The process was described last week at the Washington meeting of the Electrochemical Society by Paul L. Raymond, project manager for the Research Division, National Research Corp., Cambridge, Mass.

Aircraft and Ordnance — These are some of the practical applications Mr. Raymond proposes:

- Interior platings to reduce erosion in nonoxidizing, high temperature and pressure chemical systems. (Example: High temperature polymerization where extreme flow velocities cause erosion.)
- Linings to increase the strength and life of combustion chambers and nozzles of jet or rocket engines.

At elevated temperatures, molybdenum oxidizes almost instantly. Mr. Raymond pointed to the progress made with silicide coatings and platings of nickel.

Here are some of the details of the plating system.

High Alloy—Most of the trial runs involved tubes made from a commercial grade of AISI 4620, although the system works on Hastalloy and some grades of stainless. Internal surfaces of the tubes were bored to 1⅝-in. and finished to better than 16 microinches rms.

Metal O-rings were first used as gaskets to seal tube ends. Experience showed that asbestos provided a superior seal and resisted heating.

After careful degreasing with acetone, the tubes were given thin underplatings of copper, nickel or nickel and cobalt. Chemical underplatings of cobalt proved best.

During the plating process, the tubes are heated. External temperature measures between 1607 and 1787°F at the hottest area. For most of the experiments, an annular, high temperature gas burner proved satisfactory. Mounted on a moving platform, the burners produced a narrow band of intense heat which could be regulated to close limits.

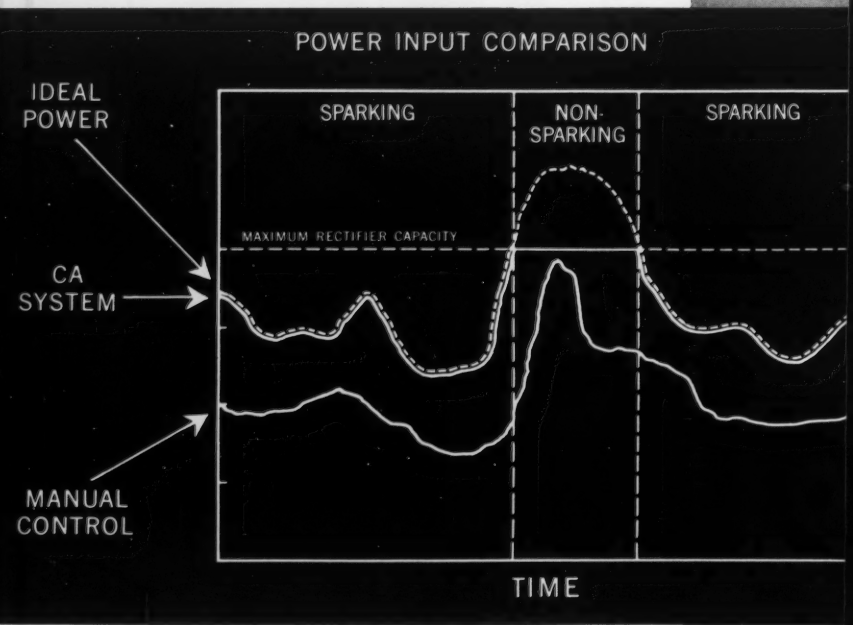
A 25 kw, 9600-cycle induction

(*Please turn to page* 164)

RESEARCH-COTTRELL'S

New CA System brings Auto to precipitators

Higher "around-the-clock" collection efficiency without any manual adjustments. That sums up the major advantages of Research's new Cottrell Automation System.



The chart at the left shows how the CA System provides these advantages. As you know, ideal electrical power input to a precipitator is not constant. It varies with changes in gas composition, temperature, rate of flow and humidity, as well as characteristics of the dust, such as size, electrical resistivity and extent of build-up on the electrodes. With conventional controls, manual adjustments cannot keep pace with these changing conditions. This difference between *ideal* electrical power and *actual* power input, under manual control, is shown in the chart. This

mation

difference means lower collection efficiency.
The fast acting electronic circuits of the CA System provide the best practical approach to ideal electrical power. During periods of sparking, electrical power input is controlled by the optimum sparking rate, which can be easily pre-set to any value between 0 and 500 sparks per minute. Under some conditions power input would have to be increased beyond the capacity of the electrical equipment in order to maintain this optimum sparking rate. During such periods the power input is governed by the *capacity* of the electrical equipment. This condition is shown in the center vertical section of the chart.
For more information on this new automation development write for your copy of Bulletin CA. It has a detailed description of how the Cottrell Automation System works and how higher "around-the-clock" collection efficiencies and lower operating costs are obtained.

Research-Cottrell

RESEARCH-COTTRELL, INC., Main Office and Plant: Bound Brook, New Jersey • 405 Lexington Ave., New York 17, N. Y.
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RC 173

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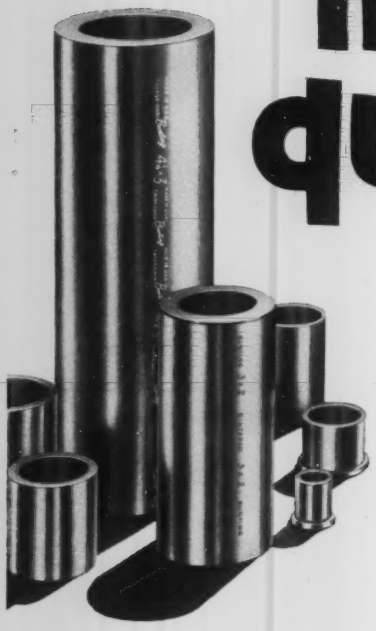

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PLATING STEEL . . .

(*Concluded from page* 161)

generator gave better results. It produced a heated zone 8 to 10 in. wide, compared with the one 2 in. wide produced by the gas burner. The induction heater was easier to control and produced less scaling.

Infrared lamps are used on the unheated portions of the tube being plated to prevent condensation of the molybdenum pentachloride.

Reaction — The flow diagram shows the sequence of operations. Hydrogen (helium works as well) passes through a catalytic purifier, a column filled with activated alumina and a column filled with lumps of calcium hydride. At this point, the hydrogen has a dew point less than −94°F, no free oxygen and less than 100 ppm of water vapor. Any argon or helium used in purging should also have exceptionally low dew points.

Gas pressures are reduced to approximately one atmosphere, although pressure within the system is kept slightly higher to reduce the possibility of air contamination. The system requires only slight adjustment during a run.

Gases were heated by a spiral-finned resistance heater in an asbestos jacketed 1¼-in. iron pipe.

Vessel — The molybdenum pentachloride vaporizer is a 4-in. cylinder 8 in. long. Vaporizing gas is bubbled through the molten pentachloride, passing out through a pipe in the cover. An oil bath helps vaporization and controls vapor concentration. Operating temperatures do not exceed 482°F.

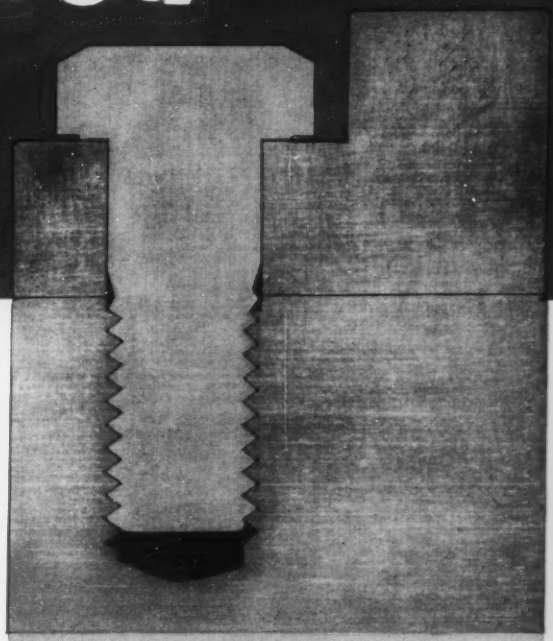
At atmospheric pressure, the argon stream is nearly saturated with $MoCl_5$. A rotameter measures the diluting hydrogen.

Variables — The ratio of $MoCl_5$ to hydrogen appears to be one of the fundamental variables in the process. Low vapor concentrations increase plating time; lean mixtures produce dense, well-bonded platings. A high ratio of pentachloride to hydrogen leaves the coating porous and nonadherent, although much thicker.

The best platings were produced by a downward movement of the burner toward the vaporizer. Unreduced nodules or grains of molybdenum chloride are wire brushed after the plating.

Engineered

TO REDUCE FASTENING COSTS



SIZE RANGE ¼" to 1½" in diameter — ½" to 12" in length

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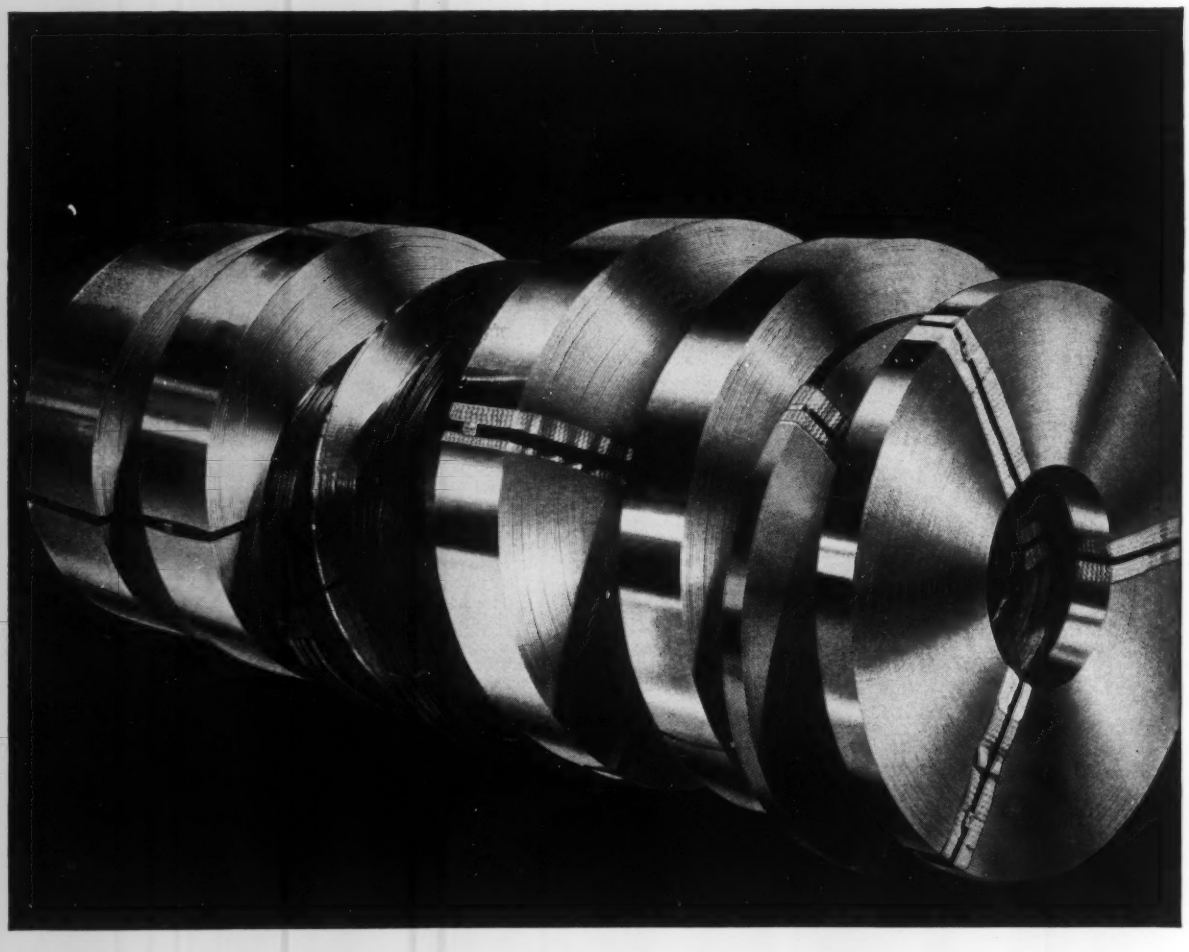

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Sales Now Geared to Replacement

Expansion programs continue to put orders on the books, but builders see replacement as their prime target. They are increasingly concerned about Bulletin F

"MACHINE TOOL buying has become more selective, with more emphasis on replacement and cost reduction."

In that statement to shareholders, Frederick V. Geier, president, Cincinnati Milling Machine Co., Cincinnati, pointed up a shift in business being experienced by the whole machine tool industry.

At the spring meeting of the National Machine Tool Builders' Association in Washington, association president Jerome A. Raterman (he's also president, Monarch Machine Tool Co., Sidney, O.) noted the shift in emphasis, but he commented: "Expansion projects are going forward today at a reasonable rate, which is healthy."

Although he admits periodic dips will come in machine tool business: "I am convinced that the long-term trend in machine tool sales will be upward."

Depreciation—The increasing importance of the replacement market to their business volume is causing builders (and other industry groups) to take keen interest in pending revisions to the still-aggravating Bulletin F. (STEEL, Apr. 29, p. 119.)

Swan E. Bergstrom, chairman of the association's government relations committee (and executive vice president, Cincinnati Milling Machine Co., Cincinnati), says: "The useful life conception as outlined in Bulletin F certainly is not in keeping with the philosophy of building a strong industrial nation . . . the spiral of inflation has made Bulletin F completely out of date. A new approach to the theory of depreciation must come forth to enable industry to recover enough money to keep plants modern and in operation."

A Key—Just how important this revision can be was suggested by one builder who told STEEL: "Our future order levels will be pegged to the customer's ability to fight obsolescence in his own shop. As it stands, Bulletin F and its concepts are holding him back. It's costing him, and us, more than we can stand if we're to gear ourselves to this mushrooming economy."

More on India

Marketing of U.S. machine tool designs in India still is being studied. A delegation of builder representatives has been selected to go to India for a first-hand look. (STEEL, Mar. 4, p. 55.)

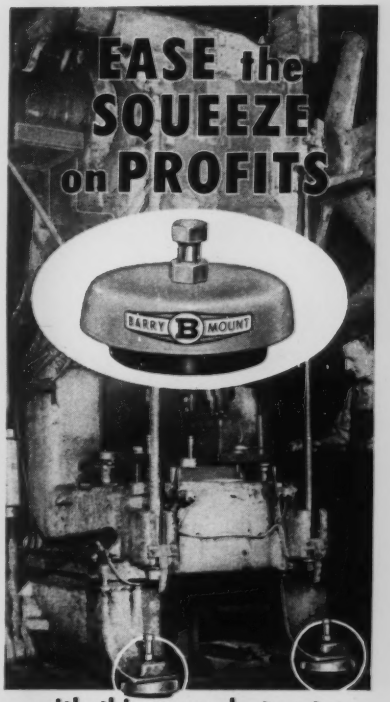
Although the mission to India was organized before the Business & Defense Services Administration found itself on a budgetary banana peel, it is still set for early summer, probably June.

Contouring

An electronic computer co-ordinates downfeed, milling head drive and chuck rotation to turn out contoured jet engine blades. The system has been applied to an 8-spindle milling machine built for the Air Force by Douglas Tool Co., Hazel Park, Mich.

The computer picks up its signals from a master cam. Feed rate of the cutters is maintained constant. As blade contour changes and becomes wider, chuck rotation slows automatically. This maintains a constant surface speed and chip load. Chuck rotation increases at the leading and trailing edges of the blade to compensate for change in dwell time.

In simulated production runs, eight blades (10 in. long, 3 in. wide) have been profile machined in 90 minutes. The blades need no grinding after milling.



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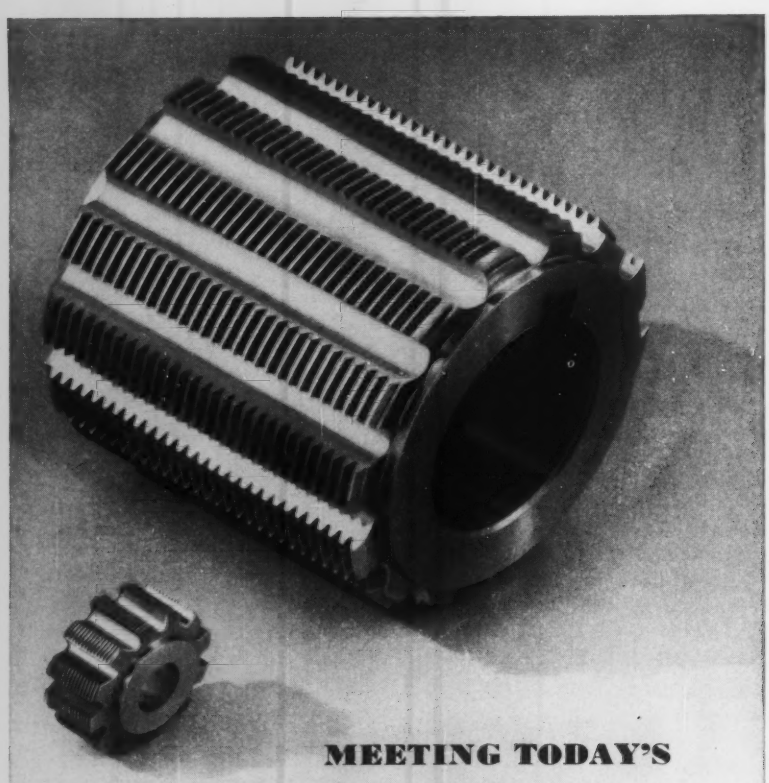

MEETING TODAY'S STANDARDS . . . AND MORE

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TAPS : THREAD GAGES : HOBS : CENTERING MACHINES : THREAD MILLING MACHINES AND CUTTERS

Vibration Tests

There are two kinds: Fatigue and specification. They point up design weaknesses

By ROBERT W. STEPHENS
Manager
Weber Testing Laboratories Division
Weber Instrument Co.
Detroit

MACHINES and structures can be shaken to pieces.

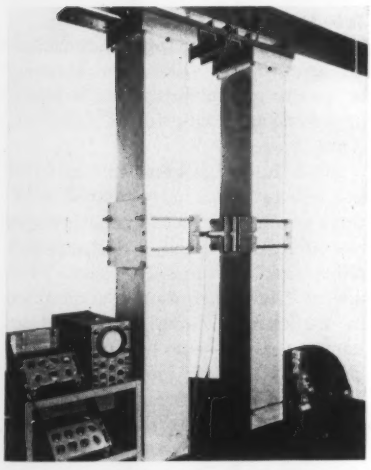
Engineers use the principle to test their designs. Called mechanical vibration testing, it's an almost foolproof way to point up weaknesses in a short time and evaluate performance before the product hits the market.

It's used two ways: As a fatigue or endurance test to study the capacity of a part or material; as a specification test to measure performance under operating conditions.

Fatigue—In a fatigue test, a material or part is tested to failure. The idea is to apply stress a certain amount as rapidly as possible. The amount of stress and the number of times per minute it's applied are measured and recorded.

Results of such tests answer these questions:

1. How many cycles to failure.
2. Which component designs will



Here is the setup used by the author to test rod end assemblies (center). It's called a tuning fork arrangement. Exciter is at lower right. Wires lead to strain indicators, vibration meter and oscilloscope

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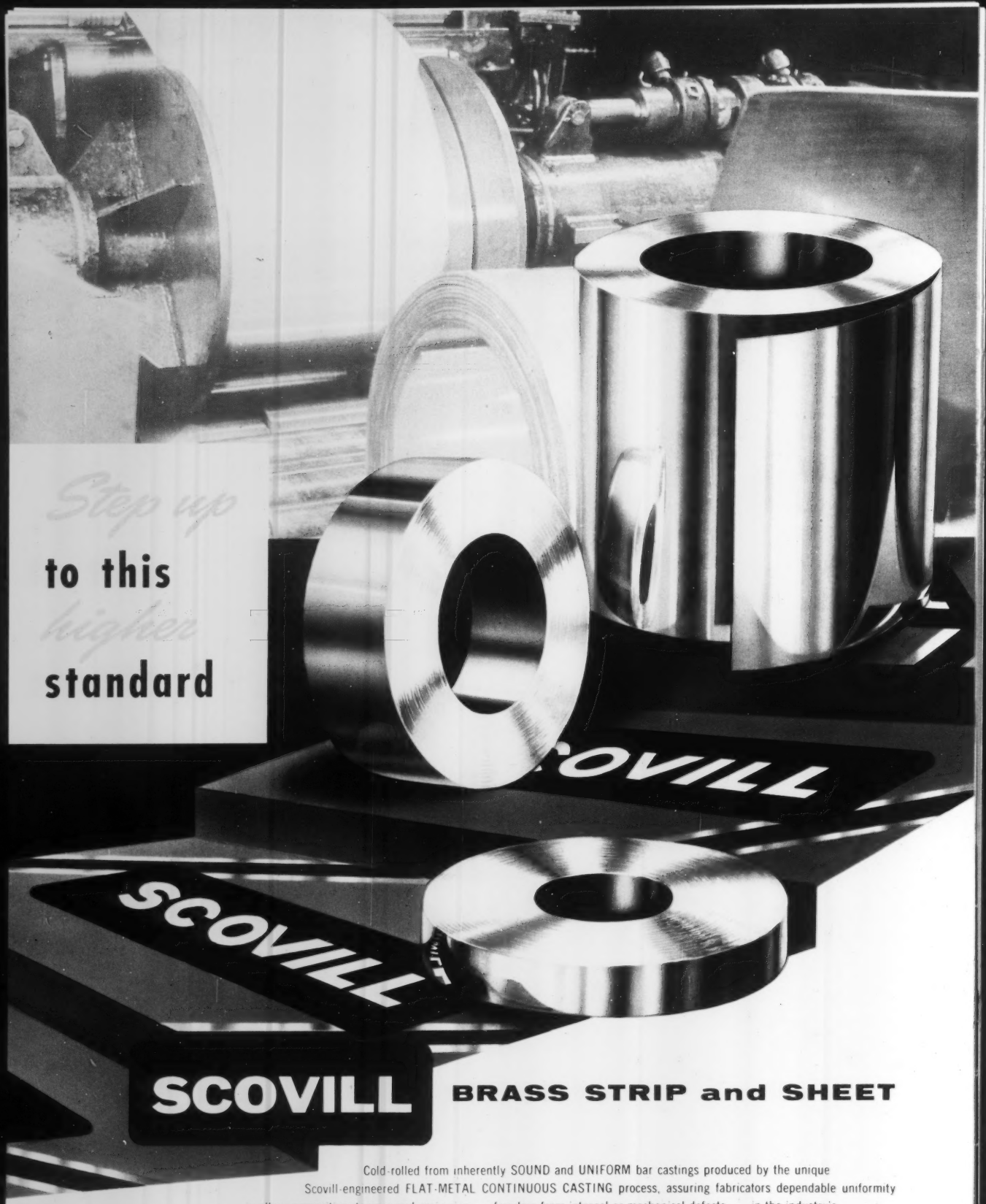

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1SC57

VIBRATION TESTS . . .

take the biggest beating.

3. How much stress the part will stand without failing.

4. What the endurance limit is for a given material.

Those questions require quantitative answers or simple endurance comparisons of several designs.

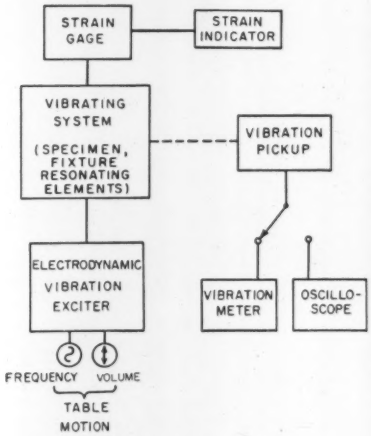
Specifications — An assembly is vibrated to simulate the operation in specification tests. No special attempt is made to stress for failure; but improperly designed components often fail.

Tests of prototypes quickly reveal what design changes are necessary. Mechanical failures are easily detected. Testing of production units approved in prototype follows a similar procedure, but emphasis is on failure in operation rather than structural deficiencies.

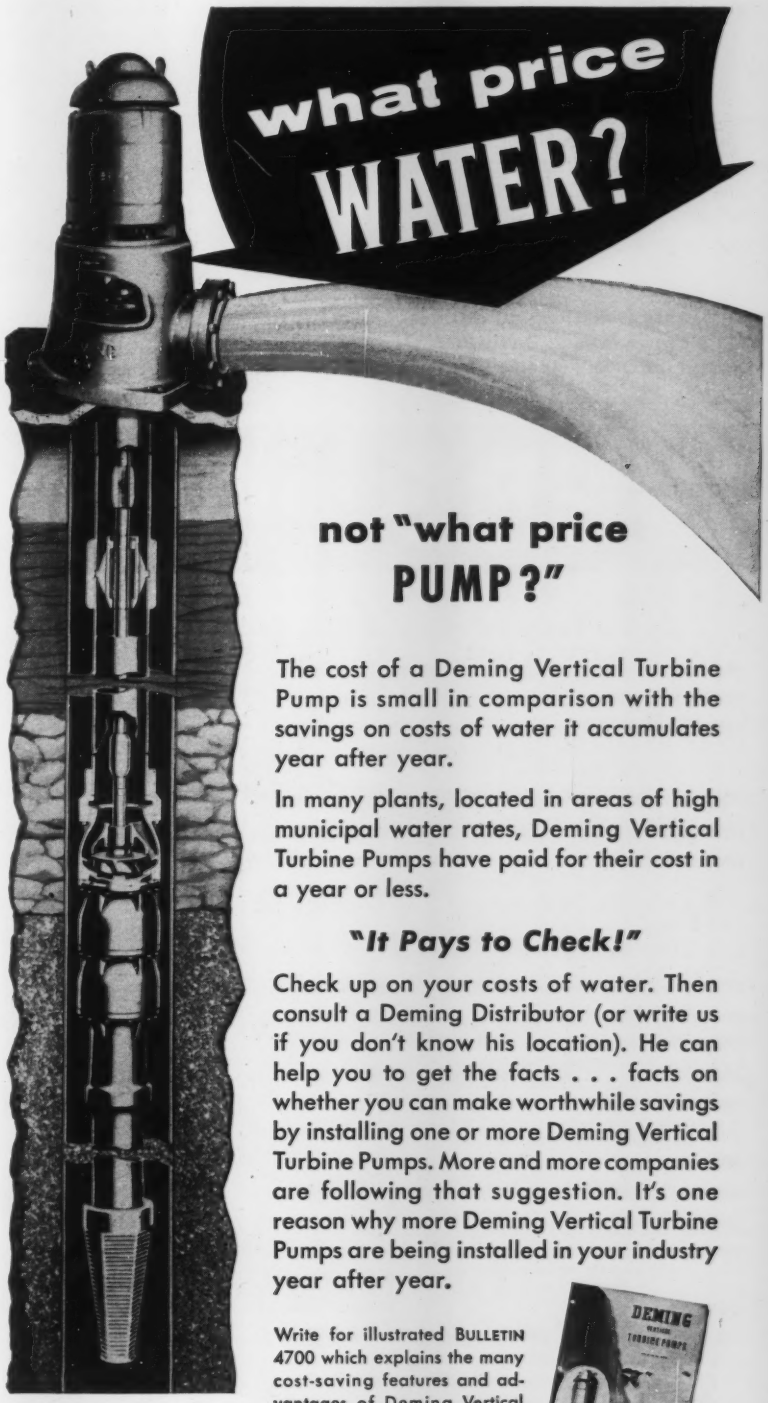
How To Test—Here are the basic elements for fatigue and specification testing: A vibrating system and instruments to measure the motion of that system.

The vibrating system includes the specimen exciter table and test fixture. In resonant testing, the vibrating system also includes external resonating structures.

The exciter table supports the vibrating system. The frequency and volume of motion in the exciter table must be accurately controlled. Although such motion



This schematic diagram shows the relationship between the several components of a strain testing system. Vibration pickup and strain gage are attached directly to the specimen being tested



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VIBRATION TESTS . . .

may be accurately known, it is often desirable to study vibration at several specific points. One or more pickups are secured to the specimen at different points, and their electrical output is fed into vibration meters. (They show total vibration amplitude, vector velocity or vector acceleration.) The pickup can also be connected to an oscilloscope.

Resonance — Almost all fatigue testing in the Weber Testing Laboratories Division, Weber Instrument Co., Detroit, is done at resonance to obtain extremely high forces in the specimens. That way, it gets performance which is considerably above the rated capacity of the exciter.

All fatigue tests follow this sequence:

1. Construct the vibrating system. Design it so that the specimen load vibration is like it is in service. The resonance of the system usually is not a natural frequency of the specimen.

2. Determine the resonant frequency of the system. It is that frequency at which a large increase in vibration occurs at a given power input to the exciter. This is measured with an amplitude meter.

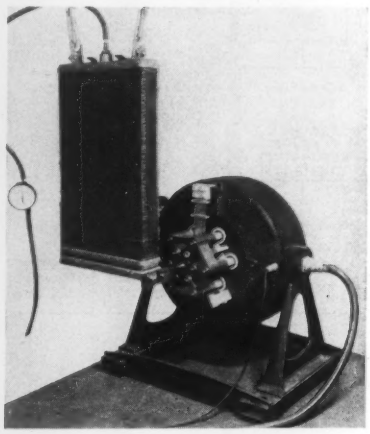
3. Select an operating frequency. The vibrator is normally adjusted to a value slightly off resonance so that sudden shifts in the resonant frequency of the system, due to specimen failure, show up clearly as a pronounced change. Weber likes to operate exciters at about 100 cps. It provides a reasonably rapid test, yet is low enough to measure easily.

4. Adjust the exciter input. Load or stress magnitude is the condition usually specified in a fatigue test. To get it, the exciter force (or vibration amplitude) must be determined experimentally.

Strain gages and indicators can be used to set the level of power input to the exciter. The stresses should alternate (positively and negatively) an equal amount. If they are unequal, a preloading arrangement is necessary.

5. If time to failure is too long or short, adjust the power input or frequency. Particularly in qualitative comparisons of two components, the initial stress level and power input may be too low. An unnecessarily large number of cycles before failure is evidence of that.

The most logical step is to in-



The radiator assembly is attached at its lower right-hand corner to the vibration source, called an exciter. Failure of the assembly shows up immediately as a drop in air pressure (dial)

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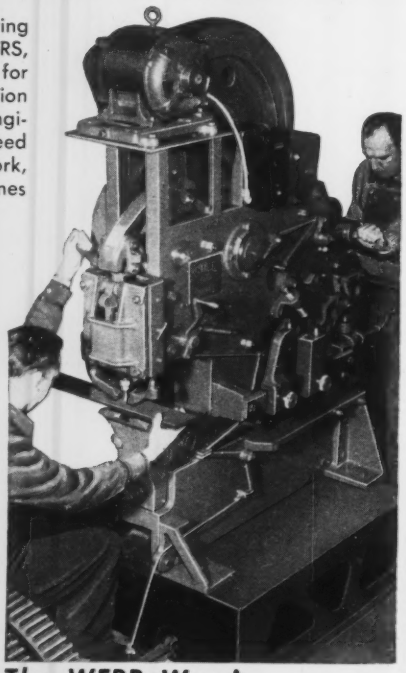

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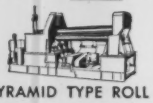

PYRAMID TYPE ROLL

INITIAL TYPE ROLL

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The 35-Ton Weldment above is the Center Section of a three-section Bed for a large Underdrive Press. This piece, and the units illustrated at the left, are typical of thousands of Steel-Weld Fabricated parts and assemblies produced by Mahon for manufacturers of processing machinery, machine tools, and other types of heavy mechanical equipment. It is possible that you, too, could benefit by the economies and other advantages offered by welded steel components in your product. In any type of heavy machinery there are parts and sub-assemblies that can be produced more economically and more satisfactorily in welded steel, because, in weldments you get greater strength with less weight, plus the additional advantages of greater rigidity and predictability. Before you place an order for weldments, you will want to discuss your requirements with Mahon . . . because here is a unique source for welded steel in any form . . . a reliable and responsible source with complete facilities for design engineering, fabricating, machining and assembling . . . a source where advanced fabricating techniques are supplemented by craftsmanship which assures you a finer appearing product embodying every advantage of Steel-Weld Fabrication. See Sweet's Product Design File for information, or, better still, have a Mahon sales engineer call at your convenience.

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In carrier landings, planes coming in at more than 100 knots are stopped in a split second. This amazing performance is made possible by having each plane hook onto one of several wire ropes stretched across the flight deck. Both plane and rope receive an almost unbelievable shock at the moment of contact. Needless to say, only top-quality wire ropes can be used for this application because . . .

you can't bargain with safety

While your use of wire rope differs from this carrier application, *safety should be just as important to you.* For, although a "bargain" rope may save you money, it can cost you your peace of mind. So don't bargain with safety. Buy a rope that's a *quality* rope—buy Wickwire Rope. 5049

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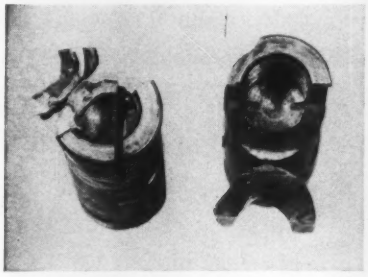
crease the stress level and reduce the failure time. If the stress level is specified, failure time can be reduced by increasing frequency. In resonant systems, that may be inconvenient since the natural frequency of the vibrating system must be increased. The engineer must be certain that the test frequency selected is not too high to measure accurately the number of cycles at failure.

6. Detect the failure. There are two ways to find it: By changes in the vibrating system; by inspection of the specimen at intervals during the test.

When the operating frequency of the exciter is set just below the natural frequency of the system, a failure reduces stiffness and its natural frequency drops. The natural frequency then approaches the exciter frequency, and you can detect an increase in vibration load at the specimen.

Minute but significant cracks can occur in a specimen before any change is observed. To detect them, it is necessary to stop the exciter at regular intervals and to inspect the specimen visually or with a commercial system.

7. Interpret and use the test results. In developing conventional curves for a material or component, failure in apparently identical specimens will occur within a band of stress cycles, called a scatter band. It is good practice to test a large number of samples to determine the scatter band.



These are typical failures of a part: At thread roots (above, left); drilled hole on the load side (above, right).

Specification Tests — There are two types of specification or acceptance tests: 1. The broad, all-inclusive types developed by the military or manufacturers. 2. Tests developed for specific mechanisms, ordinarily by a manufacturer as a standard procdure for his own plant. They are performed on identical production units of precision equipment.

This is the way to do both tests:

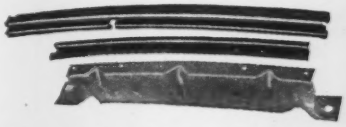
1. Excite the specimen at each resonant frequency as specified. (Test specifications indicate the vibration amplitude, acceleration and the period of the test. The direction and points of application of the exciting force are also specified.)

2. Observe, interpret failure.
3. Make design changes.
4. Repeat the preceding steps until no failure is observed.

The above procedure applies to prototype testing. In production testing, the design presumably is capable of passing vibration specifications without failure.

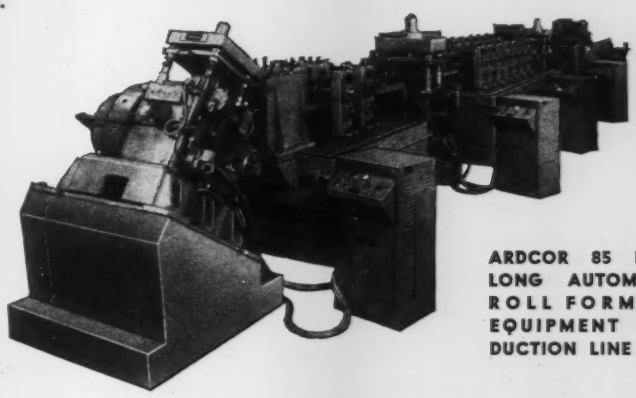
• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.

High Speed Roll Forming . . . TIMED IN SECONDS!



UPPER AND LOWER SEAT TRACKS COMPLETELY ROLL FORMED, PIERCED AND COILED 1½ FEET IN LENGTH; .078 AND .106 GAUGE STEELS.

. . . UP TO 45 SEAT TRACKS PER MINUTE, Roll Formed, Pierced, Coiled and Cutoff on this ARDCOR Completely Automated Production Line.



ARDCOR 85 FOOT LONG AUTOMATED ROLL FORMING EQUIPMENT PRODUCTION LINE

ARDCOR Roll Forming Equipment, now used by one of America's leading Automotive Manufacturers, for roll forming Upper and Lower Seat Tracks for 1957 model cars.

Starting from the coil box (in the background of the photo above), the stock travels at high speed through a succession of operations including Leveller, First Pre-Notcher, Forming Mill Passes, Second Pre-Notcher, Two-Drive Coiling Fixture, to the Cutoff Press shown in the foreground. Four Pulpit Control Stands are located at the two Pre-Notching Stations, Forming Mill, and Cutoff Press, giving the operators completely automated or emergency control at every station.

Throughout the metal working industry, modern roll forming methods are giving faster production with new and important economies. Let ARDCOR standard or special design Roll Forming Equipment introduce these new and improved production advantages in your plant.

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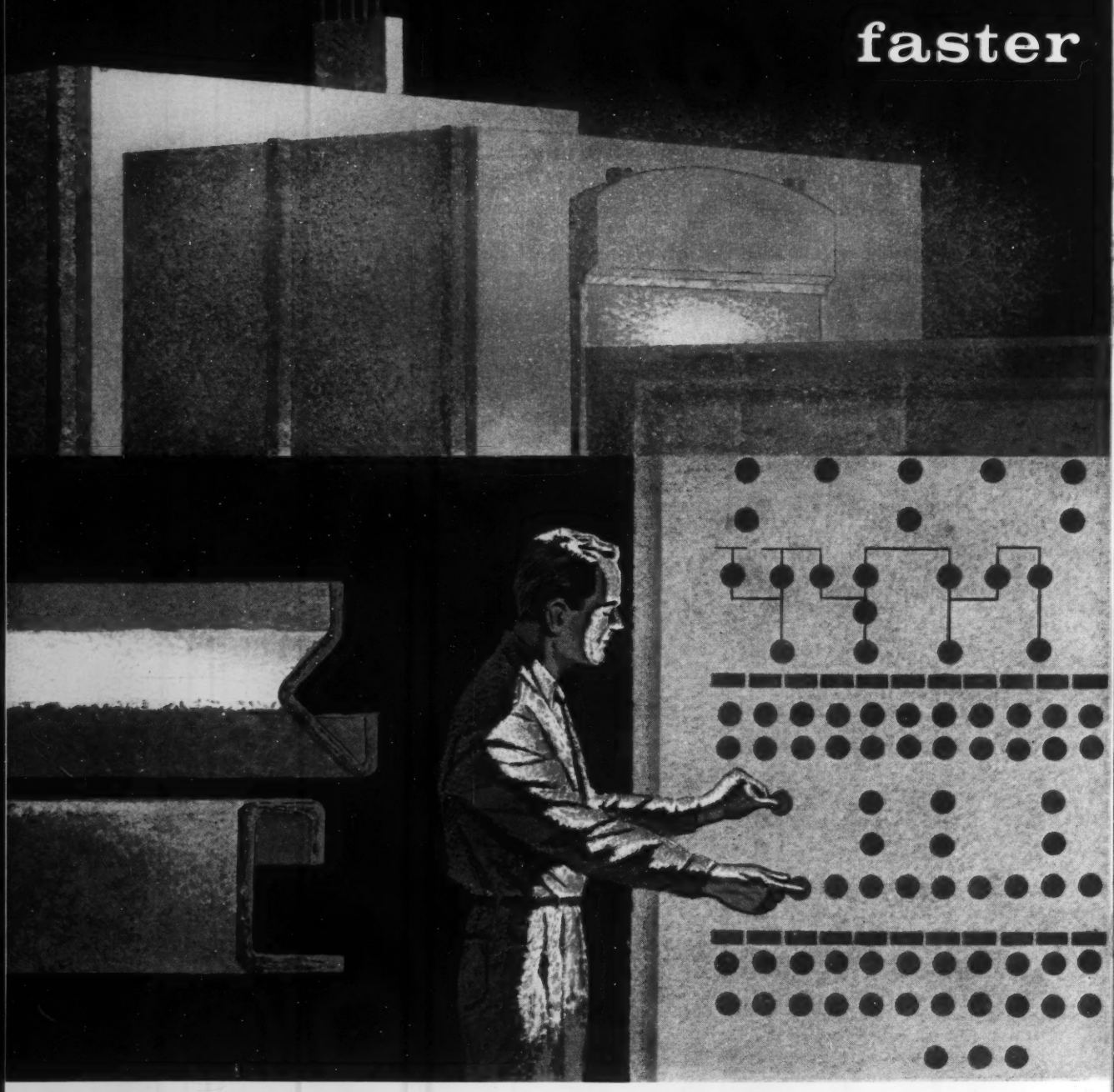
They* had to heat treat faster



***RESULTS: A better way to anneal extrusions** In a major aluminum plant, it used to take 3 men 8 hours to load and anneal 3600 lbs. of extrusions in a conventional, vertical furnace.

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. . . with these flexible, timesaving steps

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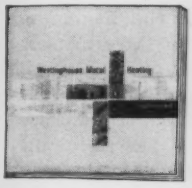

YOU CAN BE SURE...IF IT'S

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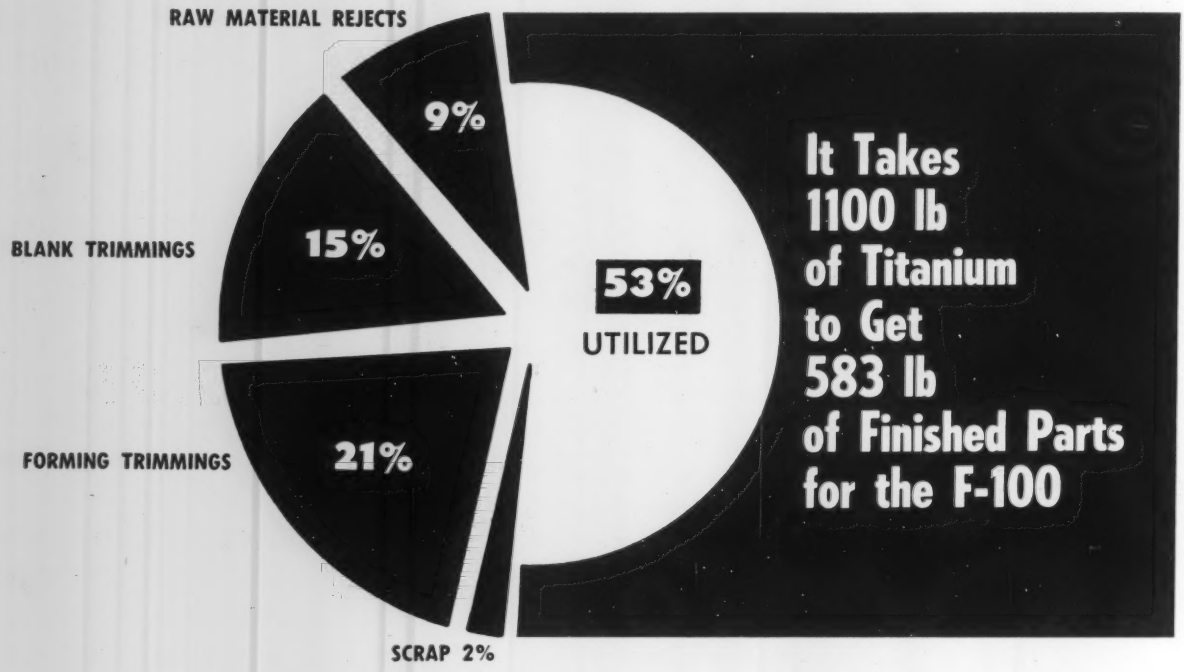


Titanium Forming:

2.5 Million Lb of Experience

Out of North American Aviation's seven years of production experience come these facts about methods and tools for fabricating one of industry's newest structural metals

FROM 1950 to the beginning of this year, North American Aviation Inc. used over 2.5 million lb of titanium. Most of it went into the F-100 Super Sabre.

The company passed along its titanium know-how at a meeting of the Advisory Group for Aeronautical Research & Development (a NATO organization) in Oslo, Norway, on Apr. 24. L. P. Spalding, laboratory director of the Los Angeles division of North American, talked about his company's experience with forming:

Where It Goes—The F-100 has about 600 lb of finished titanium parts, made from 350 lb of alloy sheets, 230 lb of unalloyed sheets and a few pounds of forgings and machined fittings. Essentially, all these parts go into the aft fuselage section which surrounds the jet engine, afterburner and tail pipe.

Structural members (longerons, frames and most of the exterior skins) are made of the 8 per cent manganese alloy; the unalloyed metal is used for shrouds, ducting and the exterior skins at the extreme aft end. In this discussion, most of the information is about alloy sheets. (They represent the largest and most important application in airframe construction.) These sheets have been used in the annealed condition in thicknesses of 0.025 to 0.187 in.

Procurement—The current specification for alloy sheets includes these requirements:

Ultimate tensile strength . . . . . 120,000 psi min
Yield strength (0.2% offset) . . . . . 110,000 psi min
Elongation in 2 in. . . . . 10% min
Bend radius—under 0.070 in. . . . . 3T (T = sheet thickness)
0.070 in. and over 3½T
Flatness—over 0.025 in. . . 3% max
Manganese content . . . . . 6 – 9%
Hydrogen content . . 150 ppm max

Where's Titanium Going?

"BY 1958, production of titanium mill products is expected to run at a rate of about 30 million lb a year," said R. I. Jaffe at the Oslo, Norway, aeronautical research conference. Dr. Jaffe represented the Titanium Metallurgical Laboratory (Department of Defense), Battelle Memorial Institute, Columbus, O.

He sees the need for titanium declining somewhat in 1959, but increasing in the early 1960s to perhaps 80 million lb a year to keep pace with the production of Mach 2.5 to 3 class aircraft.

Note on flatness: When a straightedge is laid across the sheet in any position or over any length, the sheet surface shall not depart from the straightedge by more than 3 per cent of the distance between the points of contact of the straightedge. For sheet thicknesses of 0.025 in. and less, the allowance is 5 per cent.

In addition, the specification controls impurity content (including carbon, oxygen, nitrogen and iron), surface condition and tolerances.

Tests—Major sources of difficulty have been nonuniformity of gage and physical properties, poor surface condition and lack of flatness. Surface defects and failure to pass the bend test have been the trouble spots.

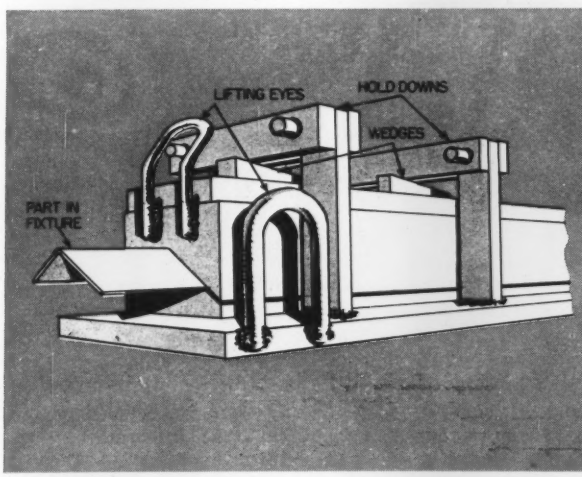
Practice is to accept the vendor's test report, which certifies physical properties (two sheets per lot, each tested in the longitudinal and transverse direction), chemical analysis (three per ingot —top, middle and bottom) and a bend test on each sheet, with examination of the bend at X20 magnification for signs of cracking. Finally, thickness is measured at 2 ft intervals along the center and both edges of every sheet.

Upon receipt of the material, tensile tests are run on 10 per cent of each lot. The vendor's bend test samples, which are included in the shipment, are reexamined, and repeat tests are run if necessary. Each sheet is checked for surface condition, flatness, gage and dimensional tolerances.

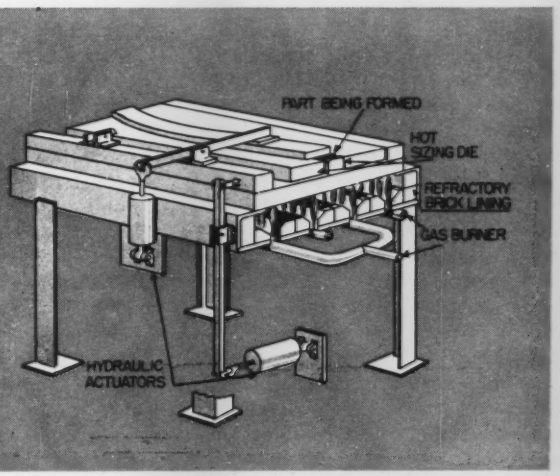
Preparation—Because of the material's high cost (about $20 per pound), much effort is put into the layout of blanks to get the most use from stock sheets. Average utilization over two years is 85 per cent.

Sheets are purchased to a nominal size of 36 x 96 in., but suppliers are permitted to ship random lengths of 84 to 114 in.

The material is stocked in 1 in. increments and drawn out selectively to obtain the best nesting pattern for a set of parts. Many rectangular exterior skin

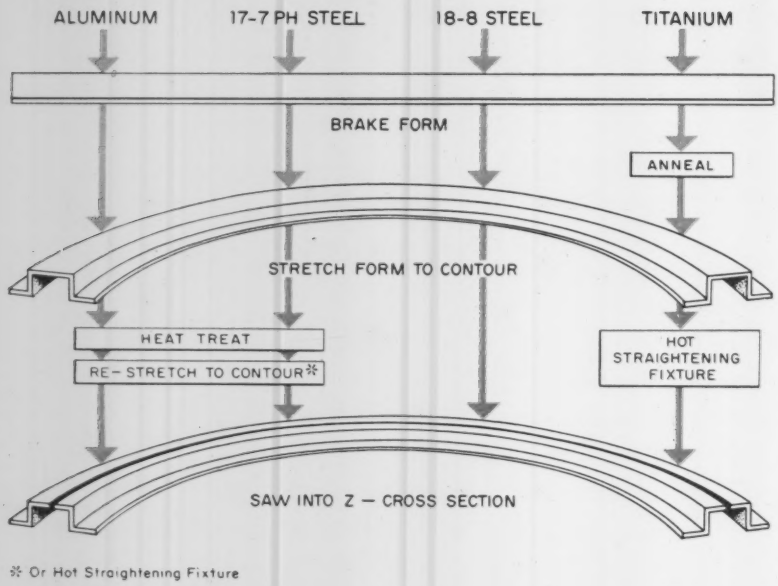


The metal is straightened in a heated air furnace at 950°F. North American designed this fixture as a weldment to cut replacement expenses



This hot straightening press was developed by North American. It simplifies forming by reducing the number of operations

How to Make Z Sections for Aircraft



* Or Hot Straightening Fixture

These are the steps needed to fabricate several materials into curved Z-sections

parts are ordered to exact size or multiplies, so that the vendor takes the scrap.

Shearing—Done cold, shearing presents no particular problems in gages up to 3/16-in. Heavy duty equipment, rated for 3/8-in. capacity with steel, is recommended. A blade clearance of 0.002 to 0.004 in., varying with material gage, is used.

When blanks are narrow enough, they are deburred by a draw bench which uses tool steel knives. Larger parts are deburred by belt sanding.

Blanking — Small, irregularly shaped blanks of 0.050 in. gage or less are blanked in crank presses, using conventional pancake dies—they are made of medium carbon steel and have flame-hardened cutting edges. Blanked edges are deburred by belt sanding. Considerable care is required in deburring blanks, since edge imperfections frequently cause cracking in forming operations.

Routing (spindle shaping) of cured or irregularly shaped blanks, commonly used for aluminum, isn't successful. All combinations of router bit materials and configurations, speeds, feeds and coolants gave unacceptably short tool life. Because of this failure, blanks which cannot be sheared or are too large for die blanking are produced by nibbling. The scalloped edges of nibbled blanks are dressed by belt sanding.

Flattening—Producers have met the 3 per cent flatness specification, but this is still not adequate for some exterior skin parts. To overcome this difficulty, a process of creep flattening was devised. A stack of five to ten sheets (or part blanks) is clamped between two steel plates 1¾-in. thick and the assembly charged into a furnace at 1000°F.

Because of its mass, the load requires several hours to reach temperature, where it is held for 30 minutes, removed from the furnace and allowed to slow cool. Sheets come from this operation almost flat. North American has salvaged over 50,000 lb of titanium by this process. Producers are using it to supplement roller and stretcher leveling, their conventional flattening techniques.

Hot Forming—Heat is widely used in forming. Many parts which cannot be cold formed are readily made on cold dies if the blanks are preheated in air ovens to 900-1050°F. (At the time of forming, blanks may be 600 to 800°F.)

The high yield strength of titanium and its narrow range between yield and ultimate, allow little room for error in working. Springback cannot be predicted consistently, so it is impossible to provide a fixed allowance for it.

Uniform elongation is limited, so only about 3 to 4 per cent stretch can be obtained cold. Where hot stretching is not feasible, forming in stages with intermediate anneals may be required. Using normal fabrication techniques, the metal does not lend itself to shrinking. This should be remembered in the design of parts, tooling and manufacturing processes.

Bending—Part designs normally call for a 4T (4 times sheet thickness) minimum bend radius. (And 3 to 3½-T is required by material specifications for alloy sheets.) For unalloyed materials, the corresponding values are 2 to 2½-T for specifications and 3T minimum for design.

Angle and channel sections with straight bends are formed on power brakes, using a radiused punch and channel die. The degree of bend and allowance for springback are governed by the depth of the punch stroke. The operator controls this.

About 80 per cent of the work is done with cold tools and with blanks heated to 900-1000°F. The remaining 20 per cent (larger bend radiuses) are formed cold. Parts are lubricated with a dispersion of molybdenum disulphide in mineral oil, lanolin or petroleum grease.

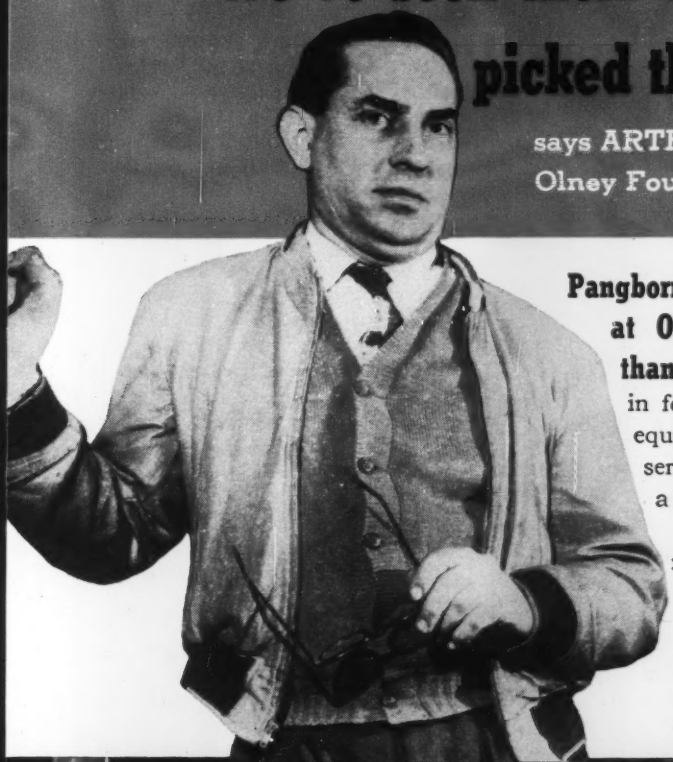
Hot Pressing—Some small parts (usually angles with a joggle at one or both ends) are made by a two-stage process, using a mating V-block and punch. In the first step, a hot blank is formed to approximate shape on cold tools. Then the cold part is reformed on the same tools, which are heated by conduction from special holders on the platens of a hydraulic press.

Cartridge or strip-type resistance heaters are embedded in the holders. Parts are held in the hot dies 1 to 5 minutes at about 900°F; they emerge in proper shape, requiring no hand finishing.

Stretching Sections — Curved angle and channel sections are produced by stretching brake formed parts which are annealed

"We've seen them all... and picked the Pangborn Blastmaster®"

says ARTHUR LAKE, Plant Engineer,
Olney Foundry Div., Link-Belt Co., Philadelphia



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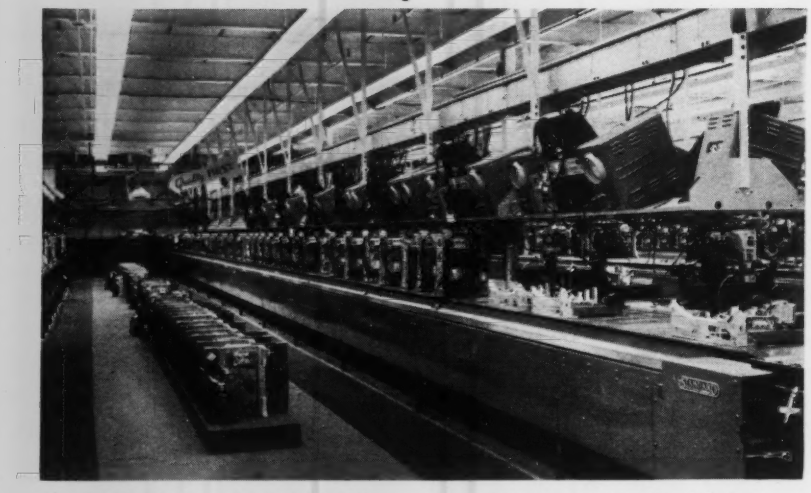

TV chassis move along Standard slat conveyor at right center. Job-tailored design assures uninterrupted, smooth work flow . . . helps manufacturer achieve high degree of automation despite complexity of operations.

Mile-long conveyor system speeds TV production line

IN this TV plant, Standard engineers designed and installed more than 2800 ft. of belt and slat conveyors as part of a mile-long conveyor system.

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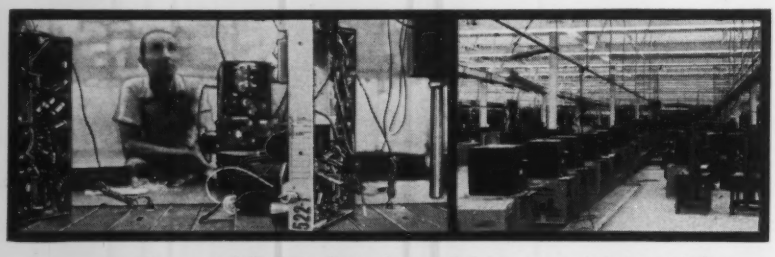

Left photo shows closeup of slat conveyor. Note integral electric sockets for circuit testing. At right, completed sets move along Standard wire-mesh floor belt.

Contact the Standard engineer listed in your classified phone book. Or, write for free catalog. Address Dept Y-5.

Standard 50 years of conveyor experience

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TITANIUM FORMING . . .

as an intermediate operation. Steel stretcher dies are generally used with a light mineral oil lubricant, although Kirksite dies may be used for short runs.

On light gage sections, this work is done cold. Troubles arise from material variability. Yield strength variations lead to uncontrolled springback, while gage variation may cause local necking. Warm stretching of heavier gage material meets with fairly good success. The dies are preheated to 400°F in ovens. Electrically heated platens are used to maintain the temperature. Forming is done slowly to permit heat conduction into the part as it wraps around the die.

A maximum of about 10 per cent stretch can be realized in the extreme outer fibers of curved sections.

Curve Contour—An effective technique has been devised for sections which pose particularly troublesome springback problems. Parts are overcontoured using one stretcher die, annealed, then restretched on a second die to exact contour. Typically, on a part with a 20 in. radius of curvature, the first stage would overcontour ½-in. at the center of the arc.

Another technique is to cold or warm stretch the brake formed part to approximate contour and give it a combined finish hot form and stress relief in a fixture. The part is placed between mating dies of hot-work tool steel, which are held by wedges. Nesting of parts is used to reduce die material.

Parts and fixtures are heated in a circulating air furnace for 1½-hours at 950°F. This operation is slow, but it produces parts to exact contour.

Stretching Skins—Exterior skin parts having curvative of large radius and in only one direction are assembled without preforming. More severely contoured parts require stretch forming, which is usually done cold over Kirksite dies. A silicon-base lubricant is used.

The narrow working range and the 4 per cent limit on stretching mean that forming can't be too severe by comparison with most other materials. Forming in stages

MicroMach extra-high-tensile stainless steel sheets up to 48" WIDE for aircraft and missile use

As the speed of today's aircraft rapidly approaches the Thermal Barrier, conventional metals are being left far behind in the race to satisfy the structural requirements of supersonic craft. Needed are metals that can withstand the intense heat caused by air friction at high speeds and still retain their strength. One such metal, MicroMach stainless, has been in use for more than a year.

MicroMach is a special aircraft and missile grade of modified type 301 stainless steel sheet furnished to higher mechanical properties than are available in other commercial high tensile grades in the full hard condition.

These sheets are rolled to extremely close tolerances (as low as plus or minus 3%) with micro-accuracy and precise uniformity of gauge. The surface of MicroMach sheet is smooth, clean and dense; qualities so important in minimizing surface friction.

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MicroRold stainless steel is also available in all popular grades and to meet regular government specifications. Sheets up to 36" wide can be had as thin as .005", and over 36" to 48" wide as thin as .010" in all commercial finishes and tempers.

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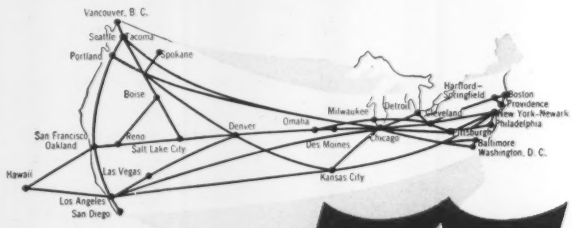
PHILADELPHIA to PORTLAND	24.15
SAN FRANCISCO to BOSTON	27.00

*These are the rates for many commodities. They are often lower for larger shipments. Rates shown are for information only, are subject to change, and do not include the 3% federal tax on domestic shipments.



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TITANIUM FORMING . . .

with intermediate annealings is a means of obtaining greater deformations.

Attempts have been made to hot stretch skin panels. They have been generally unsuccessful because of the difficulty of getting sufficient and uniform heating. In some cases, the dies are warmed to about 400°F, using an open gas flame.

Hammer Forming—Heat is essential to successful drop hammer forming. Blanks heated to 1000°F are used on unheated Kirksite dies and punches. Steel inserts may be used at points of wear, although die life is generally satisfactory. Because of mass, the dies are not appreciably heated or softened by contact with the hot blanks.

The poor shrinkage characteristics of titanium limit the use of deformation methods to stretching and bending. Controlled deformation is done with beads, or traps, which restrain the edges of the blank, somewhat like hold-down rings in deep drawing.

More die stages may be required for titanium than for other materials. Drop hammer parts are trimmed by friction sawing at 5000 to 10,000 sfpm.

Pads and Trim—Rubber pads are conventionally used to impart extra pressure for localized deformations. A special, heat resistant rubber is used with the heated blanks. A 70 Shore hardness rubber is needed, in contrast with the 40 Shore used on steel and aluminum.

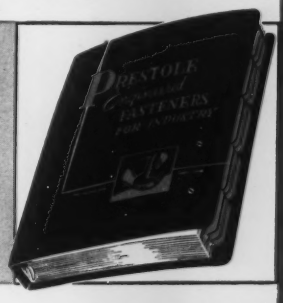
Considerable success has been realized through the use of net size blanks (zero trim allowance) which can be formed only to the approximate finished shape. These are finished using hot form fixtures. There is an economic balance to be figured here between the cost of trim losses and the cost of the hot form fixtures with the extra operation their use entails. If a large run of parts with large trim loss is involved, the net size blank method may be cheaper.

Hydropress Forming—Titanium is more difficult to form on the Hydropress than aluminum or steel. Factors contributing to this are high yield strength, large and variable springback, and the limi-

more than

1,001 WAYS

for Engineers to Solve Fastening Problems!

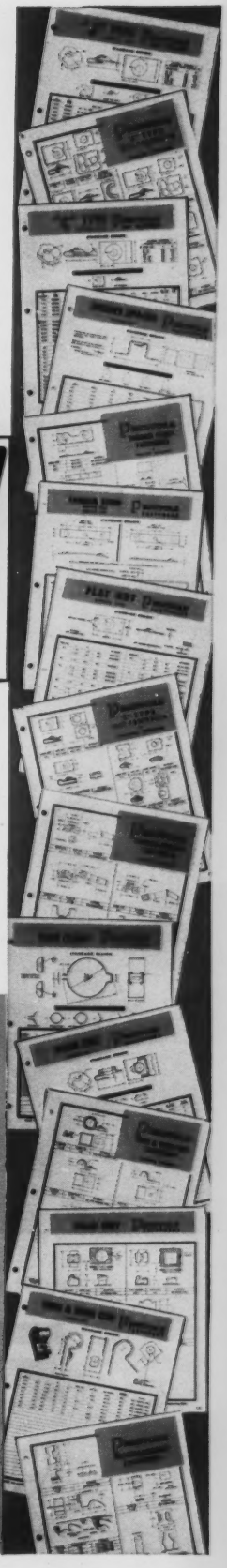


Your PRESTOLE representative has this volume of fastener information now—and will be glad to review it with you at your convenience.
See list below

PRESTOLE—designers and producers of precision-built, cost-saving, industrial fasteners of all types—has just completed a new volume of standard fastener data, designed to assist industrial design engineers in finding the *right* fastener for every application.

Complete, illustrated, specification-type data, based on years of fastening "know-how", is listed on every type of Prestole fastener available.

There is a method to solve any fastening problem . . . and Prestole has it! Let our representative call and show you how. No obligation, of course!



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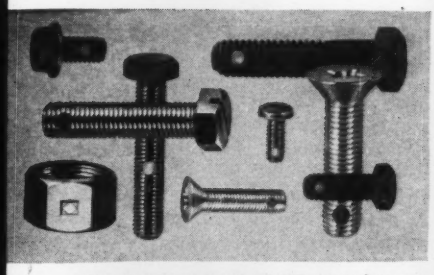
Fasteners are such a small part of final assembly cost, it pays to specify the best. Anything less can waste all of the money, time and material required to produce a quality product.

That's why it's a matter of discretion to specify Republic Fasteners. You can count on uniform excellence every time, because Republic is in complete control of every manufacturing step, from raw ore to finished product.

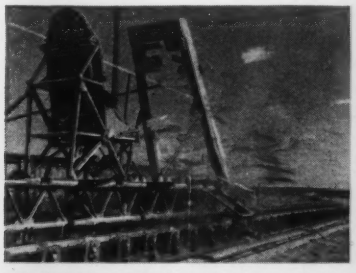
This single-standard quality control is applied to over 50 different analyses of alloy and carbon steels used in Republic Bolts and Nuts. Each is the best available for the ultimate use of the fasteners it will form.

You are assured of the very finest headed and threaded products that modern materials, methods and technology can produce.

So don't just order fasteners, *select* Republic and be sure of the best. Your local Republic representative or distributor can help you determine the type or types best suited to your needs. Over 20,000 standard and 8,000 special types and sizes are available to meet practically any requirement. For complete information, mail coupon.



UNSURPASSED LOCKING POWER, seated or not, is only one of the advantages of Republic Nylok® Bolts and Nuts. In addition, the resilient nylon insert permanently imbedded in the fastener provides re-usability, eliminates the lost motion of assembling extra locking devices and permits either hand or power wrenching. Send coupon for full details.



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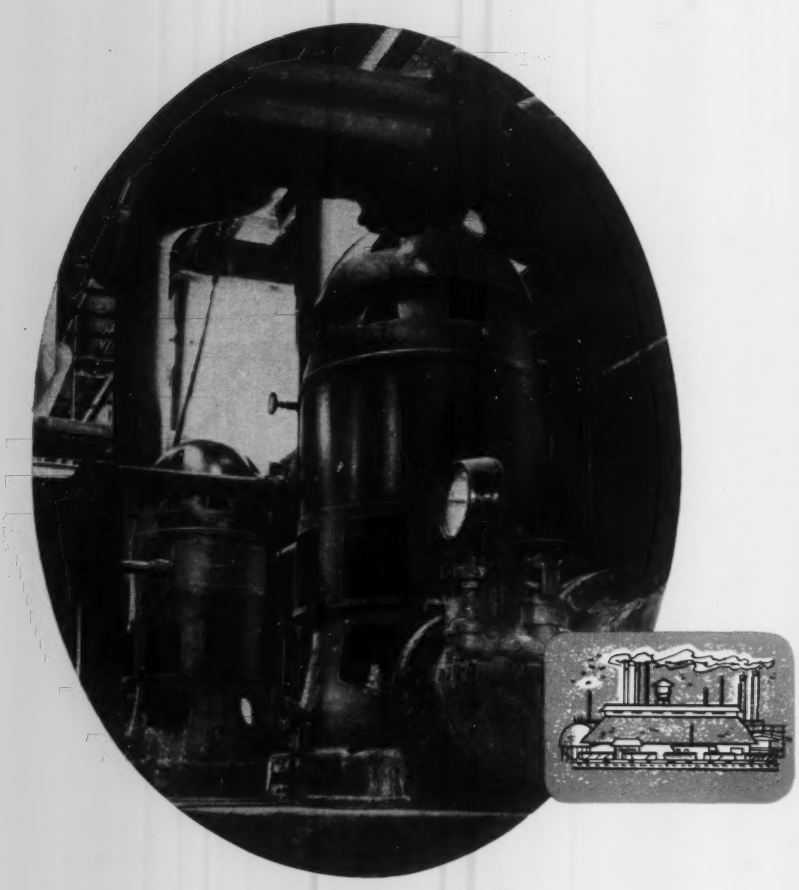

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At the Brea Chemical Company in Southern California two 50 HP Verti-Line process pumps are handling 1800 GPM at 105°F, returning water from the ammonia synthesis area to cooling towers. *These units have been operating 24 hours a day since May, 1954 – without maintenance expense other than normal service.*

Over 100,000 satisfied vertical pump users agree there's no pump like Verti-Line for low first cost, economical operation, and negligible maintenance.

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TITANIUM FORMING . . .

tation on shrinking which is frequently encountered on the flanges of Hydropressed parts. The use of heated blanks (900 to 1050°F) minimizes but does not eliminate these difficulties.

Hot forming calls for carbon steel dies and heat resistant rubber, protected by a layer of asbestos. Heavy pressure (5000 to 10,000 psi) is favored because parts are more completely formed.

On heavy gage titanium alloy parts, the dies are heated to about 600°F, the blanks to between 1000 and 1050°F. An aluminum overlay is used. This procedure produces fairly good parts, but one aluminum piece must be thrown away for each titanium part made.

Hot Straightening—A new process has been devised to finish form Hydropressed and similar type parts. It uses a hot straightening fixture which is an elaboration of the process described earlier. The part is placed between mating dies which are heated to 1000°F (by gas or electricity) and hydraulically loaded both horizontally and vertically, maintaining about 2500 psi on the parts. Pressure and temperature are maintained for 5 to 15 minutes. The parts, which need be only approximately to contour for placement in the dies, come out in perfect shape.

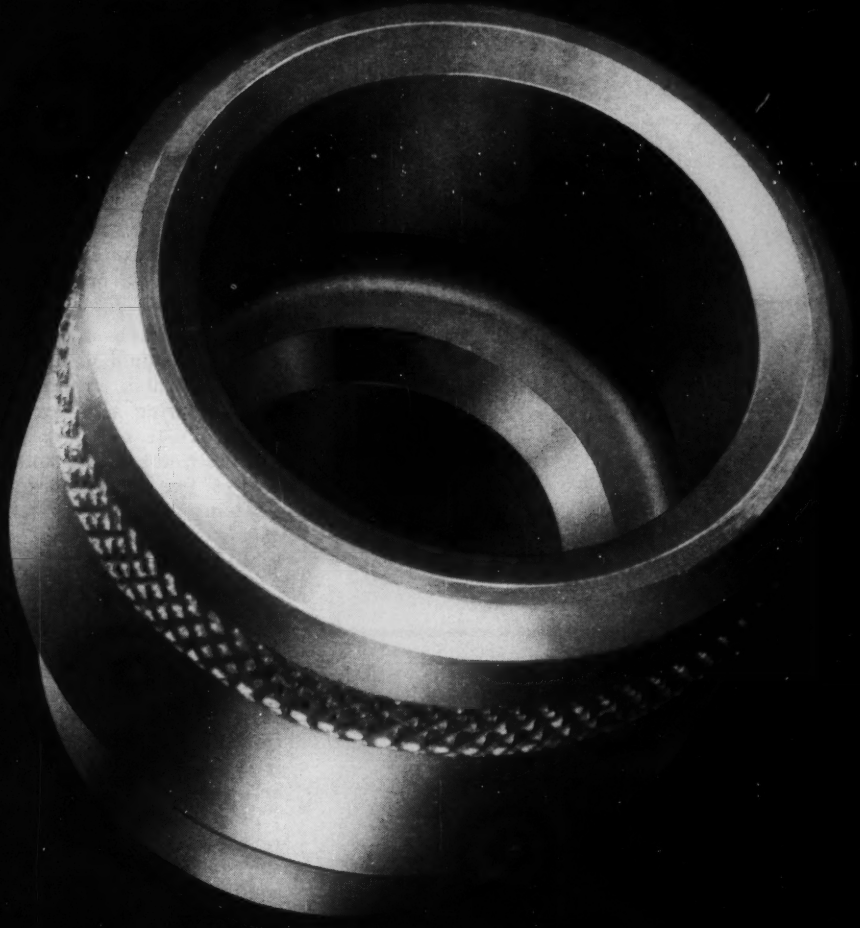
This equipment is expensive ($100,000) and usually requires the use of 5 per cent chromium, hot work, die steel inserts, since they are held at operating temperature for extended times. (Recently, some success has been had with cast iron dies.)

Hot straightening machines cut personnel requirements 75 per cent by reducing the hand working of improperly formed parts. Rejects dropped from about 20 to 3 per cent. (A portion of this improvement should be attributed to improvement in the sheets.)

Deep Drawing — Deep drawn parts have been made on a Cincinnati Hydroform press. The process features simple and economical tooling and high forming forces.

It is possible to obtain unusually deep draws by this method when the work is done in stages with

Pick exactly the right steel for any job from J & L's complete cold finished line



increased drill life 20% with J & L "1213" steel

This manufacturer of wrench socket blanks averaged 400 parts per hour when he changed to J & L "1213" steel. Form tool life increased from 10 to 20 hours. Drill life was 20% longer. J & L "1200" steels provide higher cutting speeds, longer tool life. Get facts from your distributor or write to Jones & Laughlin, 3 Gateway Center, Pittsburgh 30, Pennsylvania.

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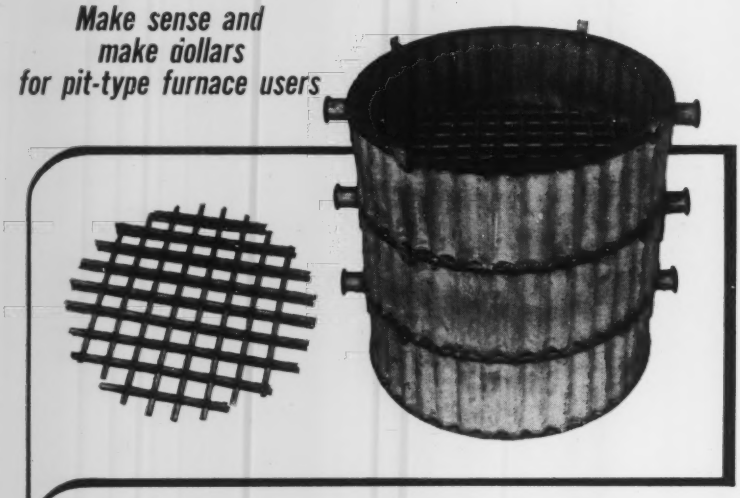

ROLOCK'S unique CORRUGATED construction

with pressure-welded truss-type grids

There are many good reasons why these new furnace baskets out-perform and outlast older types. ROLOCK's Corrugated Construction gives high strength with light weight and this, in turn, means less material to bring up to temperature with faster, more uniform heat transfer . . . and a higher ratio of pay load to basket weight. Such baskets mean a substantial saving in furnace time because of faster recovery and, in some cases, an increase in average load as well.

ROLOCK's specialized Welded Fabrication takes full advantage of this construction in every respect. The grid, for example, is built up from rounds rather than flats by a ROLOCK-developed pressure-welding method. Experience shows that such grids are far better able to withstand thermal shock. They may be reversed as required, to compensate for deflection, without cracking.

In this field, as in many other specialized applications of welded-fabricated heat-resistant alloys, ROLOCK's exceptional facilities and skills often promise major operating savings. Write us outlining your problems.

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TITANIUM FORMING . . .

intermediate anneals. Because of the high forming stresses, some warpage occurs on stress relieving, which necessitates final straightening.

Heat Treatment—Practically all parts are stress relieved or annealed after forming. Stress relief annealing is carried out in air atmosphere furnaces at 900 to 1050°F for 30 to 60 minutes. This does two things: 1. Restoration of compression yield strength (which may be lowered 20,000 psi, particularly on stretched parts). 2. Relief of forming stresses, preventing delayed cracking of parts which contain high hydrogen.

A major problem in heat treating any titanium sheet alloy is the warpage which results from the quench during solution treatment. No technique has been proved on a production basis. Methods tried involve two approaches: 1. Restraining the sheet during the quench. 2. Flattening after the quench. Flattening is restricted, since hot flattening may result in some aging, to the detriment of forming capabilities.

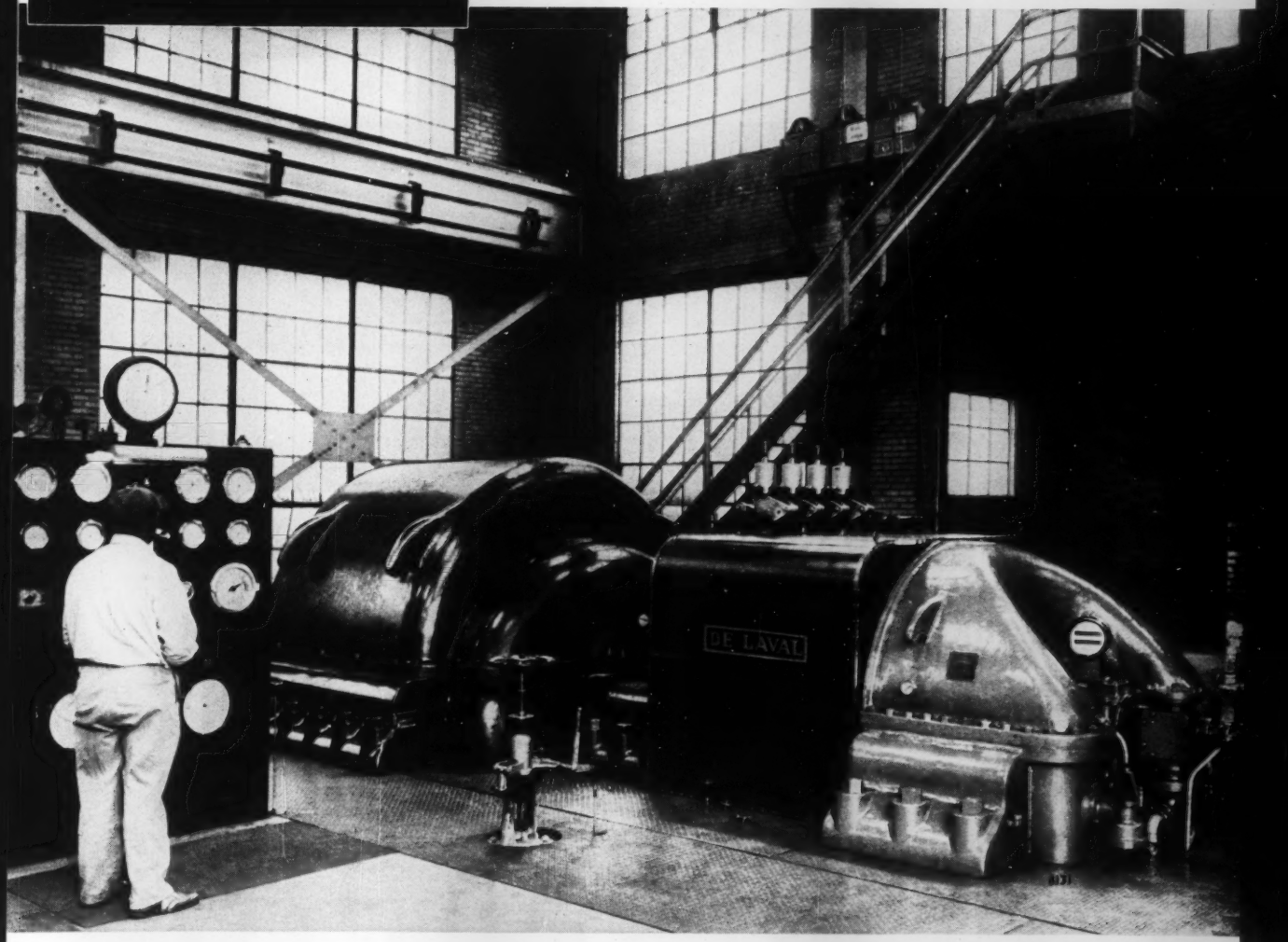
Future—Experimental work on the heat treatment of 6Al-4V sheet alloy is in progress. Solution treatment at 1675°F for ½-hour is followed by water quenching and aging at 900°F for 24 hours. These properties are obtained rather consistently: Ultimate tensile strength, 170,000 psi; 0.2 per cent offset yield, 160,000 psi, with 5 to 7 per cent elongation. The principal deterrent to the application of this material is its poor formability.

Three new alloys show much promise as heat treatable sheet materials: 3Al-6Mo, 4Al-3Mo-1V, and 2½Al-16V. In the solution treated condition, they are expected to have yield strengths around 65,000 psi, a yield-to-ultimate ratio of perhaps 0.6, elongation of 10 per cent and a 2T to 3T bend radius. This should provide excellent formability, and after an aging treatment, ultimate and yield strengths of 180,000 and 160,000 psi, respectively.

Cleaning—Parts which have been fabricated without heat are cleaned by vapor degreasing to remove forming lubricants. Where hot

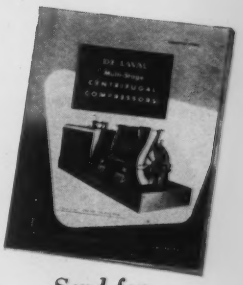
DE LAVAL
BLAST FURNACE BLOWERS

give 20 years of service at Great Lakes Steel Corp.



Shown is one of two De Laval centrifugal blast furnace blowers at the Ecorse, Michigan, plant of the Great Lakes Steel Corporation, Division of National Steel Corporation. This 85,000 cfm unit was installed twenty years ago; another 75,000 cfm unit went on the line a year earlier. Both have given dependable round-the-clock service ever since. These turbine-driven blowers are hooked up to a multi-head which enables either one to be used in conjunction with any of the three blast furnaces.

De Laval centrifugal blowers are built in single and multi-stage types to supply air in volumes up to 150,000 cfm for all classes of service in steel, gas and coke plants. The wealth of application experience acquired by De Laval over the years assures a correct and economical solution to your blower problem.



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DE LAVAL *Centrifugal Blowers*

DE LAVAL STEAM TURBINE COMPANY
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DL-381

To meet the need of expanding industries for better materials handling methods, look to Yale for advances in research, engineering, manufacturing, sales and service—as

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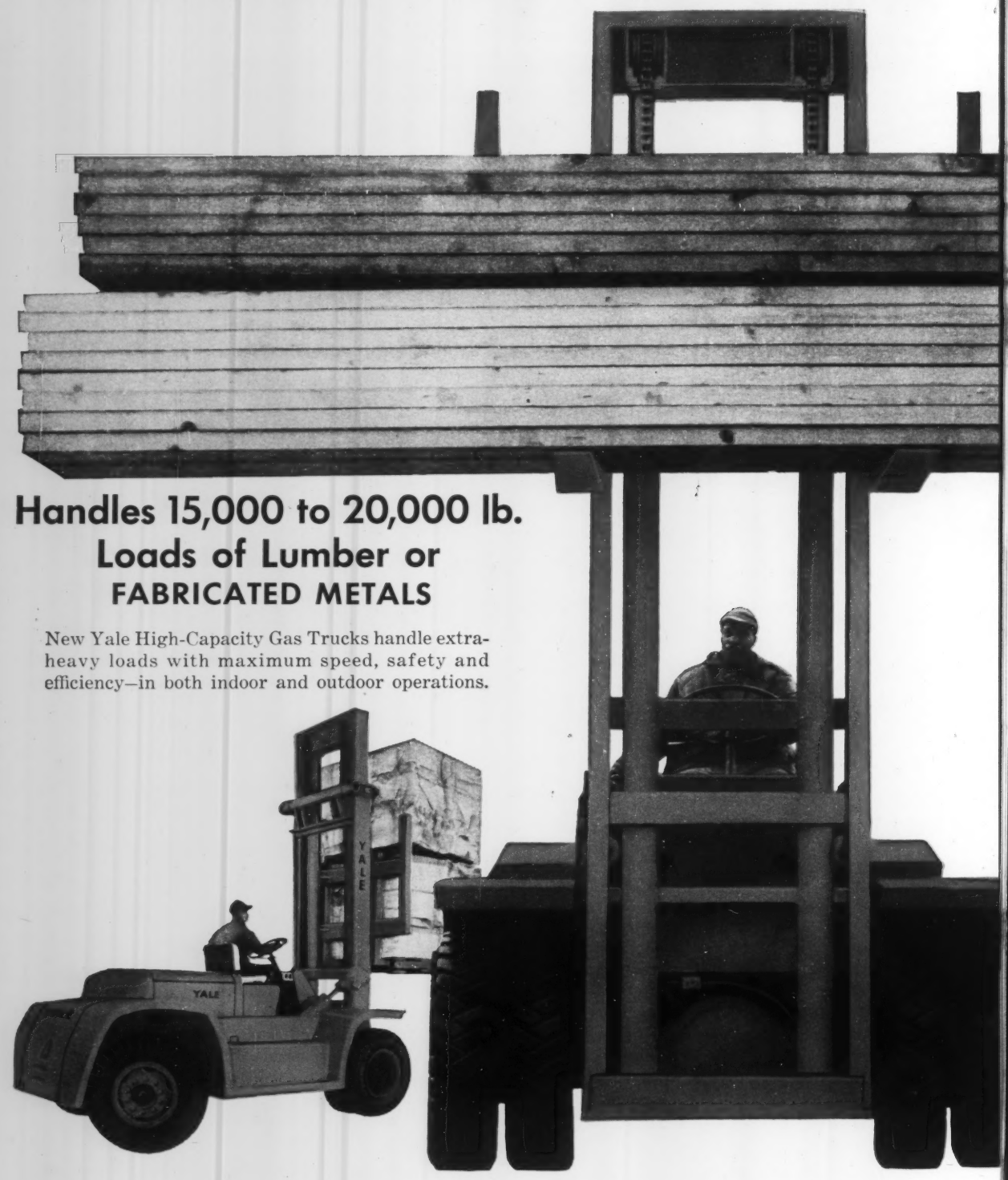
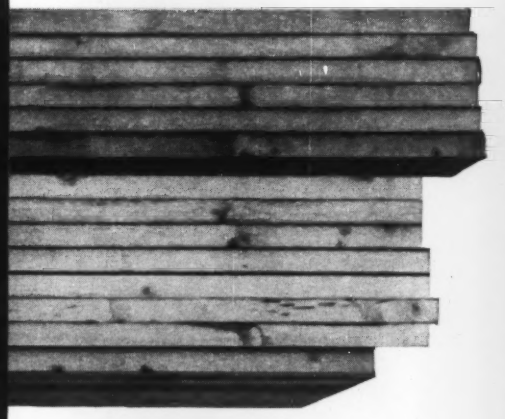
Now...first and

Handles 15,000 to 20,000 lb. Loads of Lumber or FABRICATED METALS

New Yale High-Capacity Gas Trucks handle extra-heavy loads with maximum speed, safety and efficiency—in both indoor and outdoor operations.



only high-capacity gas truck with full visibility



YALE
WIDE-ANGLE VISION

300% MORE VISIBILITY THAN ANY OTHER TRUCK OF ITS TYPE! Not just straight-ahead vision—but "corner of the eyes" vision, too—*fully functional* visibility with the big, open look of new Yale High-Capacity Gas Trucks. Operator sits high and in center. Upright channels are wide-spaced, nested to reduce frontal obstruction. Right next to them—the hoisting cylinders, one right, one left. Chains that raise carriage are in front of cylinders—*out* of the arc of vision.

Carriage has one top bar, one bottom bar—good visibility between them at all levels of fork lift. Channel cross members are at channel ends—none between. When an attachment is used, hydraulic hoses are located in front and behind cylinders—not in the line of sight. Whether looking forward or to the rear, the operator sees more. Result: these new Yale trucks with "Wide-Angle Vision" promote safer, faster, more efficient handling of 15,000 to 20,000 lb. loads.

GREATER STABILITY. Lifting, lowering, traveling—these Yale trucks keep capacity loads in precision balance! Minimum weaving with full loads, because the trucks are built low—low center of gravity, with high underclearance. Extremely rugged design. Broad lifting base afforded by two ball-mounted lift cylinders. Wide channel-roller spacing at all points of lift, plus side-thrust rollers on channels and carriage, further increase stability factor. Large-size, high-flotation tires give good traction under severest terrain conditions.

FAST CYCLE OPERATION. New Yale High-Capacity Gas Trucks have lifting speeds up to 60 feet per minute; fast, safe lowering; travel speeds up to 20 miles per hour; easy maneuverability.

TOP PERFORMANCE UNDER TOUGHEST CONDITIONS

Here are just a few of the premium engineering features—all included as *standard*—that give new Yale Gas Trucks a big edge in stamina and safety under all conditions:

- I-beam side members in frame for extra strength.
- Channels mounted on ball-bearing rollers to reduce friction and wear.
- Ball-mounted, self-aligning hoisting cylinders.
- Gear shift lever, plus hoist, tilt and attachment lever at right side of driver. Directional control lever conveniently located on steering column.
- Power steer with two balanced hydraulic cylinders, one to each rear wheel, to reduce stress on bearing points and linkage.
- Your choice of Yale Fluid Coupling or standard transmission.

Designed for complete selection of attachments—engineered for a minimum loss distance.

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YALE & TOWNE

The Yale & Towne Mfg. Co., Materials Handling Div. Manufacturing Plants in Philadelphia, Pa., and San Leandro, California

The YALE & TOWNE Manufacturing Co., Dept. A-85
Roosevelt Blvd., Philadelphia 15, Pa.

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Gasoline, Electric & LP-Gas Industrial Lift Trucks • *Worksavers* • Warehousers • Hand Trucks • Hand and Electric Hoists

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504 Prairie, Sturgis, Michigan

Write for FREE Booklet

TITANIUM FORMING . . .

forming or stress relieving has been used, a light scale is formed. This can be removed by a 2-minute immersion at 120°F in a bath of 2 per cent hydrofluoric acid and 48 per cent nitric acid, a composition which gives negligible hydrogen pickup but is not always effective.

Supplementary treatments have been devised to facilitate descaling. Before heating, the titanium is sprayed with a boric acid solution and dried. Subsequent heating produces a modified scale which is readily attacked by the acid pickle.

Another method is caustic treatment of the scale between heating and acid pickling. This effective process employs a bath of NaOH and $Na_2Cr_2O_7$ used for 10 minutes at 275°F.

Oxide Layer—In solution heat treatment, temperatures of 1500°F and up are involved, and extensive contamination may result. This is of particular concern in sheet products, where ductility may be seriously impaired by a thin layer of surface oxidation. To overcome this, considerable work has been done on protective coatings. They have been based on ceramic frits and powdered metals.

After heat treatment and quench, the coating can be removed by acid pickling in combination with caustic pretreatment. The base material shows no oxygen pickup during heating in excess of an hour at 1450 to 1850°F. An unusual feature of one of these materials is that it appears to prevent warpage during heat treatment and the subsequent quench.

Sheet has a tendency to crack (particularly on formed bend radiuses) if the surface has a brittle oxide layer which was not removed in pickling. To insure that no formed parts are cracked, all primary structural parts and all parts with a history of cracking are given a fluorescent penetrant inspection. Defects are removed by filing or grinding, and the parts are reinspected.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*

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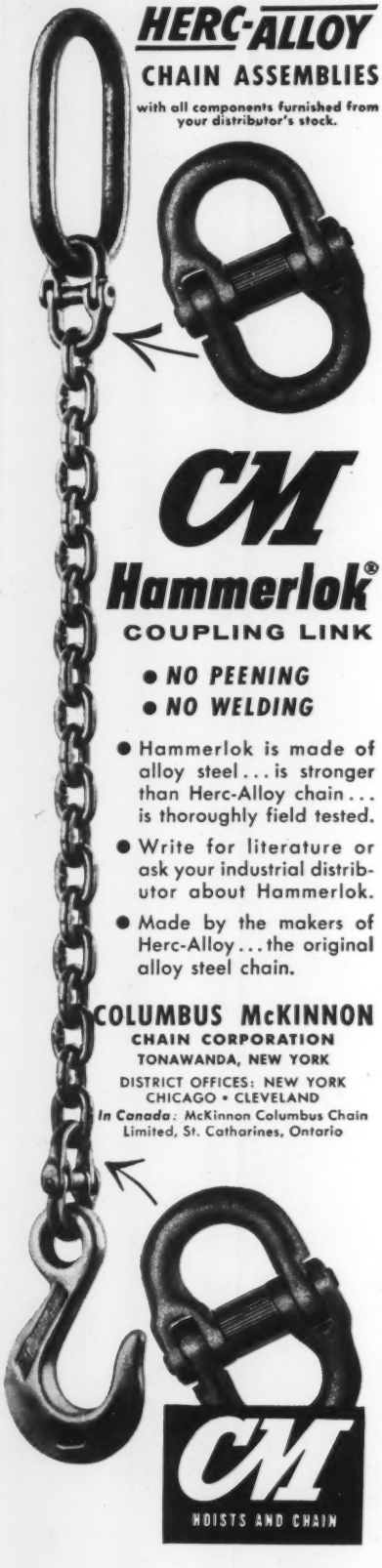

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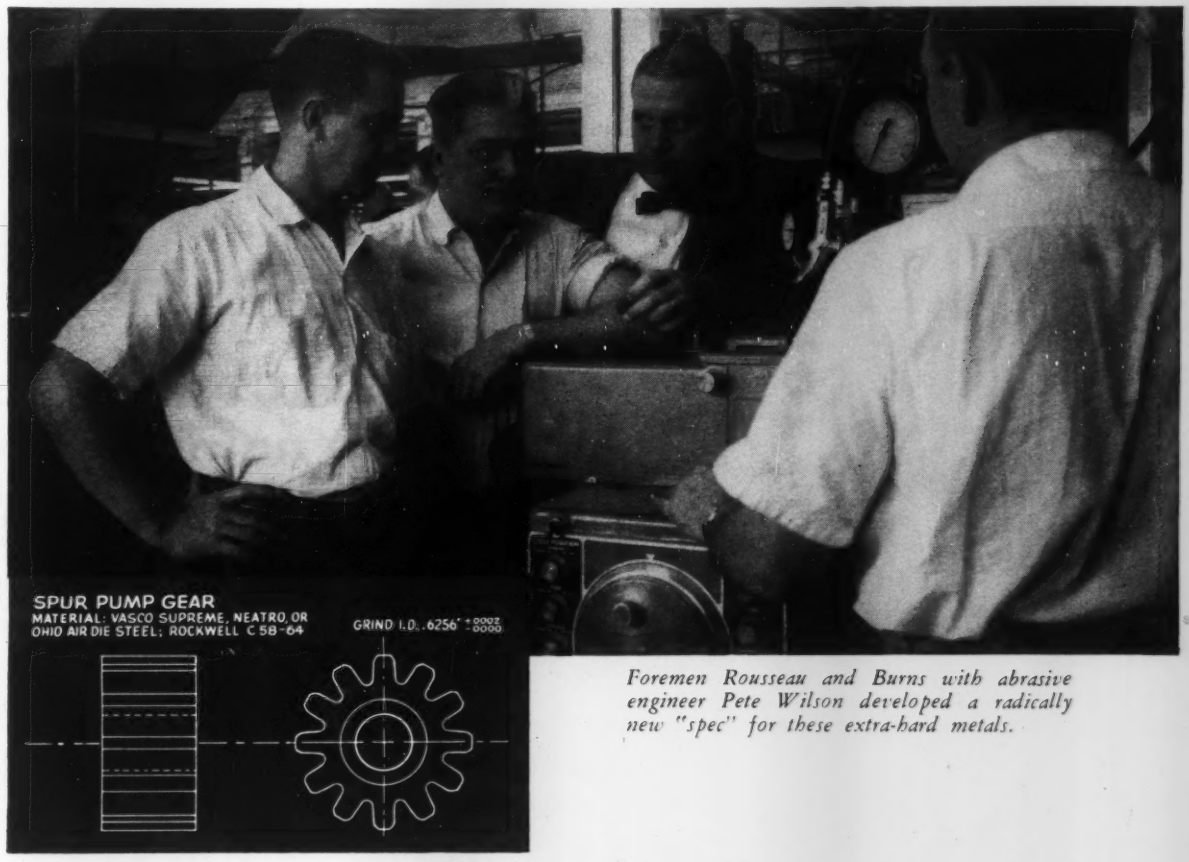


Foremen Rousseau and Burns with abrasive engineer Pete Wilson developed a radically new "spec" for these extra-hard metals.

A GRINDING PROGRESS REPORT

Extra Fine Grit Silicon Carbide Succeeds In Tough Vasco Supreme I. D. Grinding Job.

Finer grits and "softer" wheels are the usual approach to grinding hard metals. This was not enough, however, on the hardened die steels required at the W. H. Nichols Co., Waltham, Mass. Wheels soft enough to cut, with the limited pressure of internal grinding, were too soft to hold shape.

Recommended: Silicon Carbide grain, for better penetration into these metals of high carbide content, and grits much finer than the normal 90, to take smaller chips but more of them.

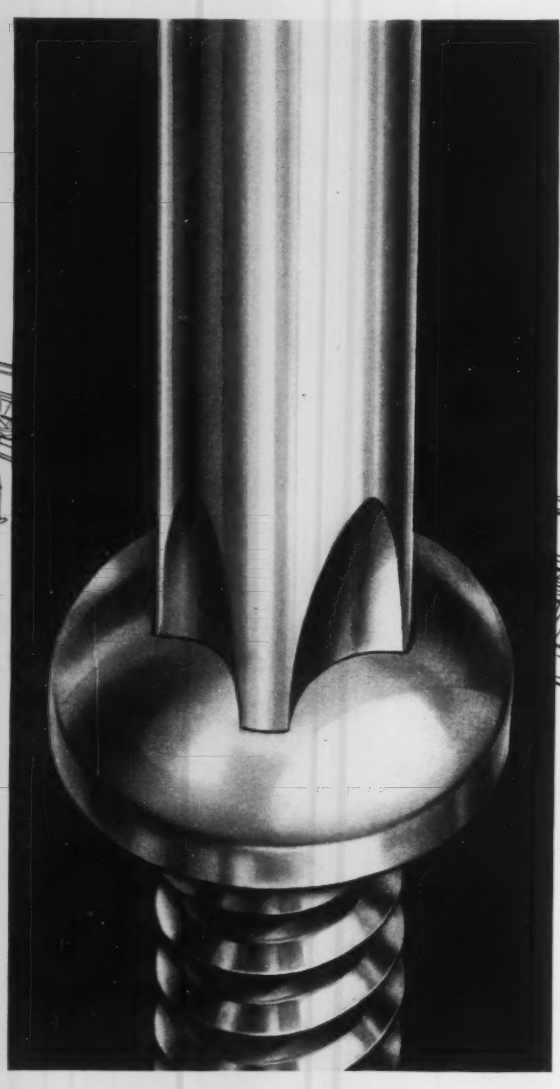
Results: Using 240 grit on the Vasco Supreme, and 150 on the Neatro and Ohio Air Die steels brought about both the quality and quantity of production desired. With wheel dressing reduced to 1/8 the amount formerly required, 50 or more pieces are now completed per wheel.

These results are typical of Bay State. You can get them through your local distributor, any branch office, or the Bay State Abrasive Products Co., Westboro, Massachusetts.

Branch offices are located in Bristol, Conn., Chicago, Ill., Cleveland, Ohio, Detroit, Mich., Pittsburgh, Pa., with distributors in all principal cities.

Slender spindle and large contact area limit infeed pressure, making wheel selection critical on hard, abrasion resistant metals.

BAY STATE®
WHEELS of PROGRESS



They may look the same but...

AMERICAN is the name!

In most instances, fastening costs are based on 4 main factors:

1. Price	**3. Quality**
2. Service	**4. Research**

Local price fluctuations may seem beneficial in some circumstances, but no one gives you more of all four than American.

American Gives You More of All Four

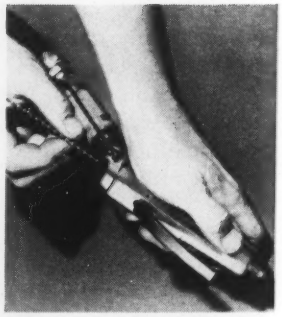
In Service — where American will meet required production schedules for single cases or car load lots.

In Quality — where superiority is produced at the machine and confirmed at the inspection tables.

In Research — where American engineers put the same skill that developed the Phillips Head Fastener into the creation of new products like SCREWSTICK for industries with special problems. SCREWSTICK makes possible power driving in place of the manual handling of small tedious-to-manage screws resulting in cost savings exceeding 4 to 1.

You can use these facilities to raise production, increase quality and lower costs because no one gives you more of all four factors: *price*, *service*, *quality* and *research* than American.

Draw your own conclusions: send us your inquiry for price and delivery or your specifications for special fasteners. Write:



SCREWSTICK being loaded into air-powered driver.

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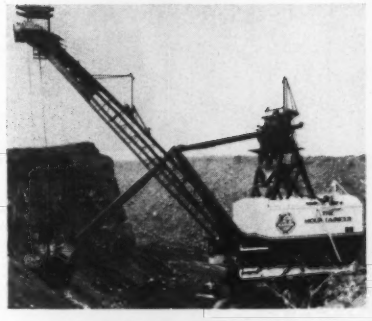

Three men operate this power shovel. Compare its size with that of the bulldozer just under the operator's cab. Power is supplied by 16 electric motors which total 9000 hp

Welds Big Dipper

Marion engineers say welding made this power shovel possible. Here are the details

By ALFRED TOZER
District Engineer
Lincoln Electric Co.
Cleveland

STEEL weldments account for more than half the weight of the 2300-ton Mountaineer, a power shovel with a 90-ton bite.

Engineers at the Marion Power Shovel Co., Marion, O., feel that it would have been impractical to build the machine without the aid of arcwelding.

Big Reach—The Mountaineer is operated around the clock, stripping overburden at the Hanna Coal Co.'s Georgetown No. 12 mine, southeast of Cadiz, O. At the end of its 92-ft stick is a dipper that can hold 60 cu yd. In combination with a 150-ft boom, overburden can be deposited 290 ft away.

Power is supplied by 16 electric motors totaling 9000 hp. The shovel is self-propelled by four pairs of crawlers, 4½-ft wide, 8 ft high and 23 ft long. A 250-hp motor drives each pair. Hydraulic jacks built into the lower frame level the shovel automatically.

Four, 250-hp motors power the hoisting operation through 580-ft hoist cables. Two herringbone drive gears, 13 ft in diameter, oper-

(*Please turn to page* 200)

This is an actual photo of a surface prepared by polishing and etching a cross-section of a forging, to reveal the "grain flow." (x2)

A PICTURE OF ADVANTAGES YOU CAN GET ONLY FROM FORGINGS

In the picture above you see the grain flow in a forging.

This picture demonstrates two things. First, the metal is dense and free from porosity. The impact or pressure of forging helps make it so. Such density is important when parts must have machined surfaces, when they must provide reliable strength and safety, and when they must be tight against leakage of liquids or gases. This quality reduces rejects and saves money. It contributes to safety and saves lives.

Second, notice how grain flow lines follow the shape of the part. This improves impact resistance and fatigue strength of the part. In closed-die forging, these flow lines can be positioned, to give maximum properties where they are needed. As a result, forged parts can be lighter, safer, stronger, and frequently less costly.

Thus this picture shows you why forged metal is *metal you can trust*. You can trust forgings for performance, and to save money. Find out how forgings can improve your products, your costs. Consult a *Forging Engineer*, and send for the booklets offered below.

closed-die **forgings** for metal you can trust

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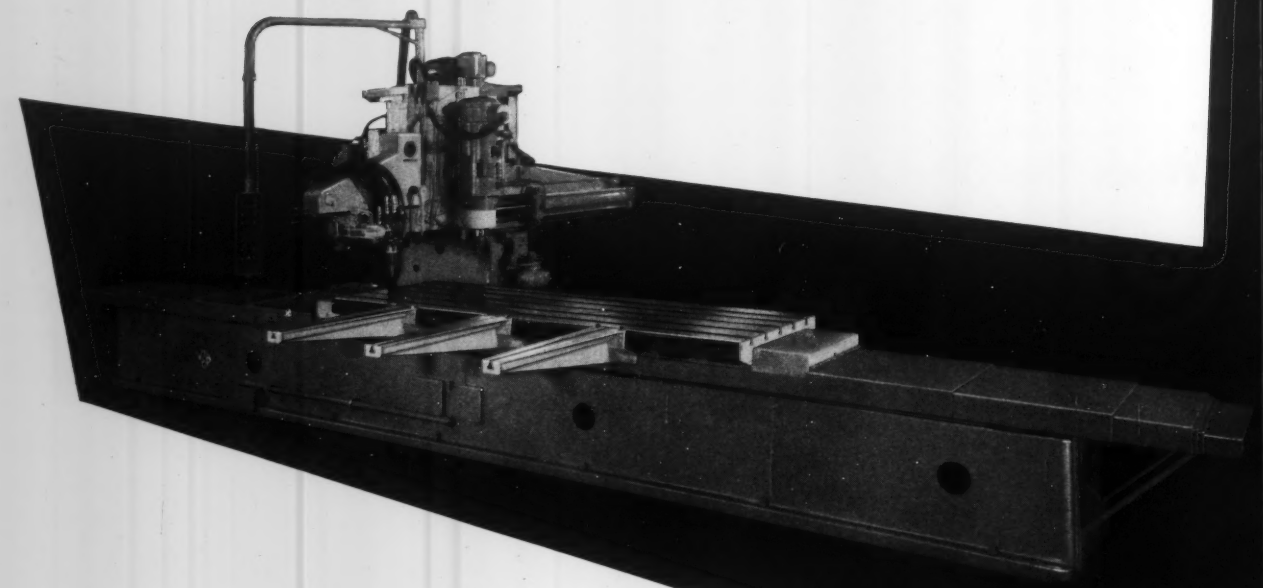
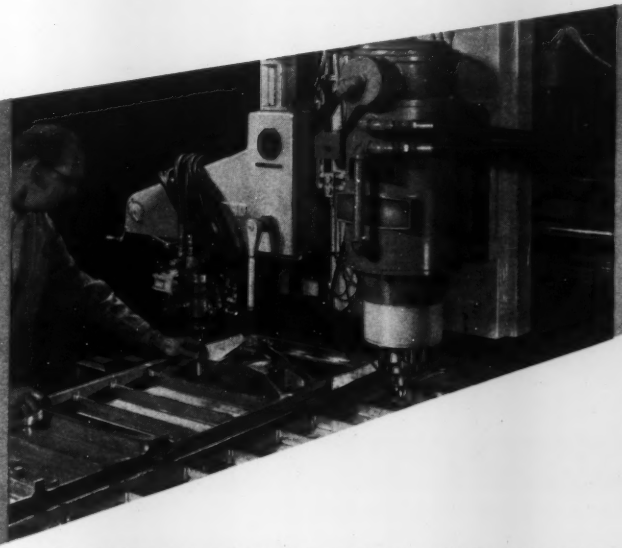
Symbolic emblem of the Drop Forging Association

Attach this advertisement signature to your letterhead and mail to Drop Forging Association to receive booklet "What is a Forging?" ☐ or "Management Guide to Use of Forgings". ☐ Check title or titles desired.

new hydraulic planer-type **air-frame mill**



for fast, high-precision machining of aluminum air-frame parts



Specifically designed for fast, high-precision machining of variable and complex, 3-dimensional shapes, this new air-frame mill speeds the machining of aluminum air-frame parts. Equipped with a highly sensitive, 3-dimensional hydraulic tracer valve for contour work, the machine also has a depth control valve for 360° tracing. Machining is traced from wood, plastic, metal, plaster of paris models, or actual parts. Available in sizes to 36" x 36" x 10 feet.

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30 HP Hydraulic
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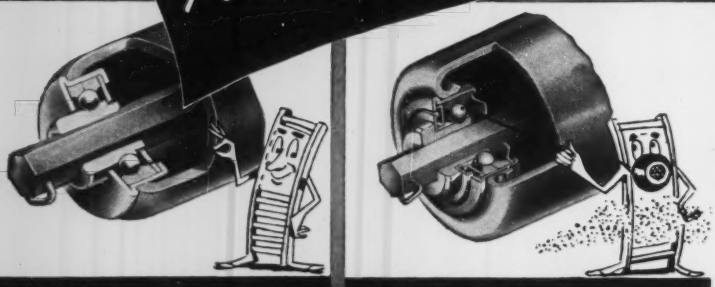

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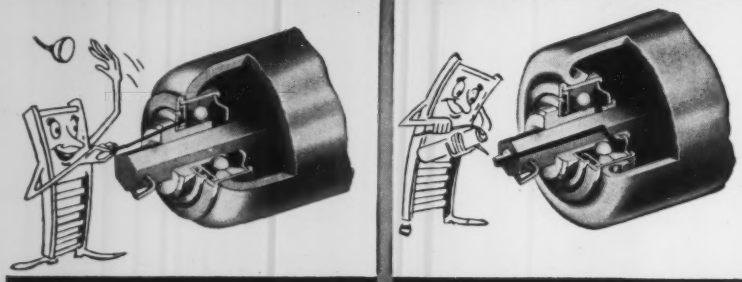

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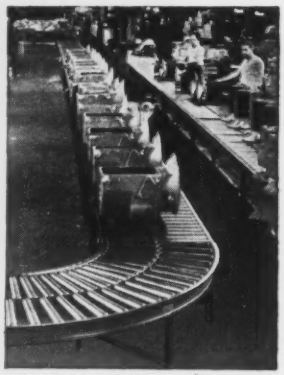
Conveyors are available with various types of rollers and frames, in different sizes and spacings, and in any width from 6 inches on up. BUSCHMAN can supply 45° and 90° curved sections, switches, spurs, work stations and other components to provide a complete, efficient materials handling system.



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COMPLETE CONVEYOR SYSTEMS FOR ALL TYPES OF INDUSTRIES • ENGINEERED • MANUFACTURED • INSTALLED

WELDS BIG DIPPER

(*Concluded from page* 197)

ate the twin hoist cable drums from the upper frame platform.

Steel — Weldments include mild steel sheets and plates, standard structural shapes, forgings and T-1 —a rolled, low alloy, high tensile steel. Over 92,000 lb of electrodes and coil wire were required.

Manual, automatic and semi-automatic submerged arc methods were used in the shop. Field welding was confined to manual procedures. Principal types of filler metal included E-6012, E-6016 and E-9015 rod. Mild steel and manganese alloy core wire were used for submerged arc operations.

Sheet metal and nonstructural parts were welded with E-6012 electrodes. Mild steel structural parts were welded with E-6016 (low hydrogen electrode) or mild steel wire. Low alloy, medium strength structural assemblies were handled with E-6016 rods or with manganese alloy core wire in automatic submerged arc setups. Low alloy, high strength steels (like T-1) were joined with E-9015 low hydrogen electrodes. Some stress relieving was specified.

Base—The heaviest weldment is the lower frame (597,000 lb). It was shipped to the erection site in 13 sections.

The lower frame assembly is 40 ft square and 8 ft deep. By sequencing and peening field welds, the flatness of machined surfaces was held within 0.025 in. over the length and width of the frame.

The frame has a hollow, forged steel center pin 6 ft in diameter. It houses an elevator which can carry three men and can operate while the shovel is rotating.

The second heaviest weldment is the upper or rotating frame, which carries the main hoist drums and other drive mechanisms. It weighs 533,300 lb and is 45 ft wide, 48 ft long and 5 ft deep.

The machine has a crew of three —two operators and one oiler-mechanic.

The shovel costs $2.6 million.

Fabrication took 7½-months, field erection and final assembly another 7½.

The entire machine (there are 500 bearings) is lubricated automatically.

ALCO machinist checks dimension on press shaft at forging plant in Latrobe, Pa.

NEW FROM ALCO AT LATROBE: OPEN-DIE FORGINGS FOR INDUSTRY

Same ALCO steel, same intense quality control as ALCO circular forgings; Hi-Qua-Led-Steel® also available

ALCO now makes open-die forgings up to 40 ft long and 30,000 lb at its integrated Latrobe, Pa. plant. If you use open-die forgings, this means that quality forgings are now readily available for your product. Here are some of the advantages you can expect:

High uniformity among forgings of the same specifications. ALCO quality control continuously checks progress of each piece through production.

Exact conformance to your specifications. Even in steel chemistry, ALCO's open-hearth production of its own steel assures accurate carbon or additive content. Any AISI grade carbon or alloy is available.

Lower cost, especially if you do extensive machining. ALCO alone offers Hi-Qua-Led Steel forgings. They can lower your machining costs by as much as 50 per cent.

For more information contact the nearest ALCO sales office, or write Spring & Forge Division, Dept. OCF-4, P. O. Box 1065, Schenectady 1, N. Y.

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Palletized Handling

All incoming parts at Buick are packaged in unit loads. It eases a rehandling problem

THROUGH their palletization program, material handling engineers at Buick Motor Division of General Motors Corp., Flint, Mich., are trying to eliminate warehousing and costly rehandling.

Ideally, every production station would have its own receiving dock so parts could flow directly from boxcar and truck. Since this is impossible, the company has established a central receiving dock with incoming loads received on expendable pallets that can be transported to the work station for immediate use.

A fleet of 36 fork trucks makes the palletization program click. They move about 1200 tons of incoming parts daily for the final assembly plant.

Interdepartmental — Shipments between departments also are palletized. Engines and transmissions which arrive on Buick's own railroad (it runs the length of the 1½-mile plant) are shipped on special steel pallets. These are not expendable.

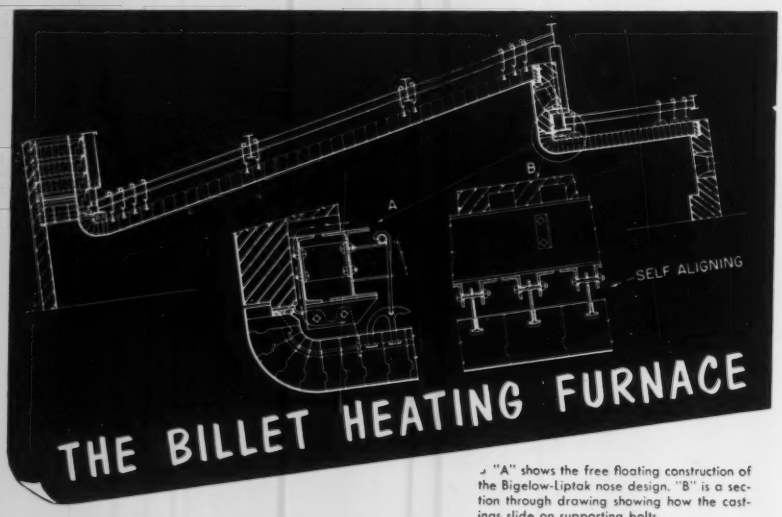
Unit load reaches the end of gravity roller conveyors in the receiving department and is picked up by a 4000-lb capacity Elwell-Parker fork truck

Industrial fork trucks again provide the muscle to handle these palletized loads. The engine and transmission assembly line runs along the railroad siding. Pallets are stacked between the siding and the assembly line and are moved to the line as pallets on the line are emptied.

Engines—Each engine weighs 700 lb. Three are loaded in the special pallet which is fitted with bar clamps. They keep the engines stationary during transportation. Adding the pallet (860 lb), each load weighs 2960 lb. Length of travel from freight car to assembly line is under 100 ft.

Movement of transmissions, like that of engines, is never more than 100 ft. The parts are packed four to a pallet; three pallets are handled each trip. Total load for a truck is 4200 lb, with transmis-

Five-chassis train is loaded with incoming parts. Each carton contains 550 housings for the steering column



↓ "A" shows the free floating construction of the Bigelow-Liptak nose design. "B" is a section through drawing showing how the castings slide on supporting bolts.

THAT LEADS WITH ITS NOSE...

THE PROBLEM . . .

A new radial nose tile for billet heating furnaces. Previously, cumulative expansions of rigidly hung nose tile in wide metallurgical furnaces had caused mechanical failures of tile and castings . . . plus "shut down" losses of production time.

THE ANSWER . . .

A *free floating* nose designed by Bigelow-Liptak engineers to control expansion movements at this highly vulnerable point. The free floating feature is only possible with unit-suspension construction . . . another Bigelow-Liptak development.

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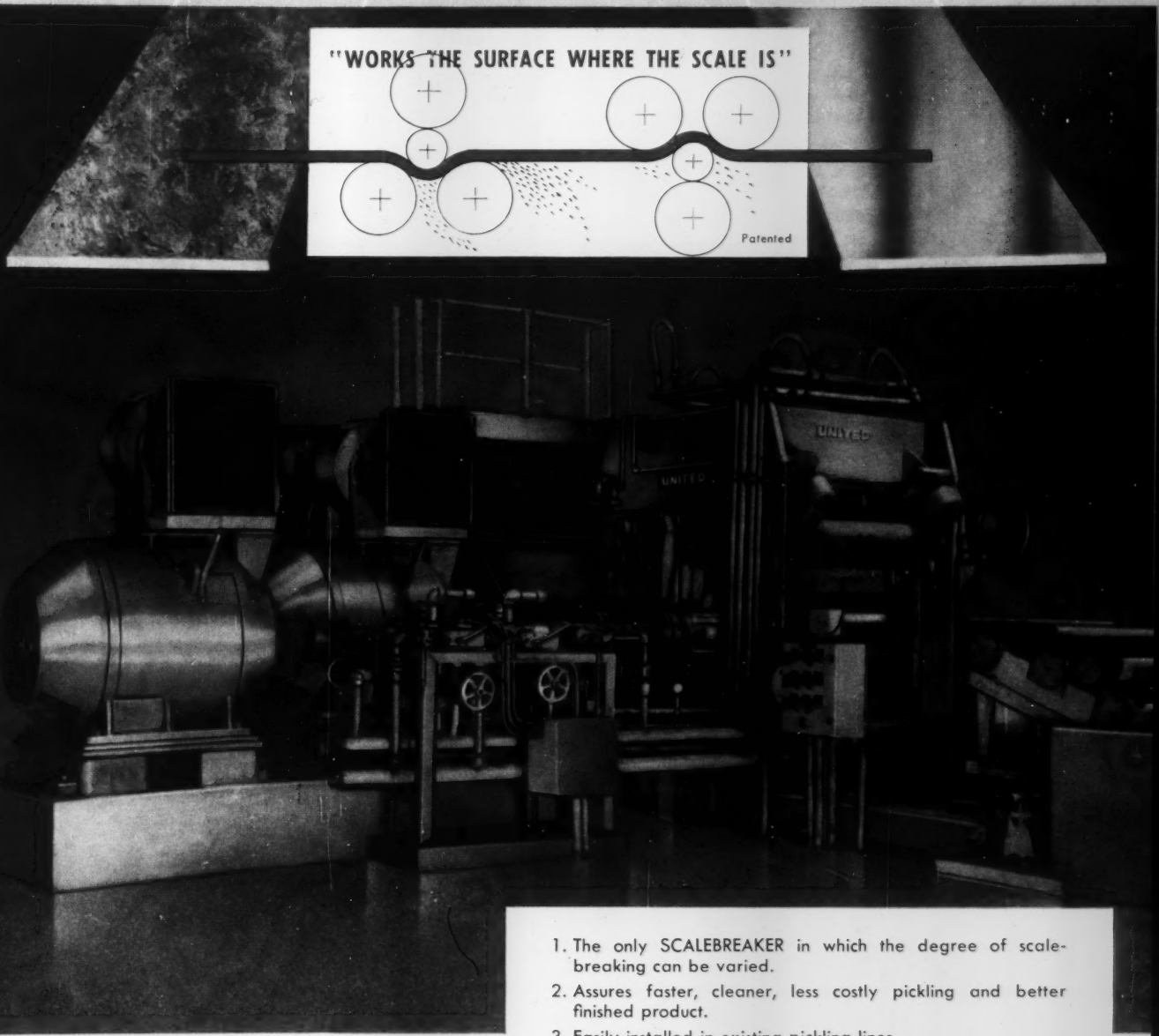

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(Advertisement)

Facts to consider when you're buying

Chromate Conversion Coatings

for Corrosion Protection, Paint Base, Decorative Finishing

WHAT IS IRIDITE®?

Briefly, Iridite is the tradename for a specialized line of chromate conversion finishes. They are generally applied by dip, some by brush or spray, at or near room temperature, with automatic equipment or manual finishing facilities. During application, a chemical reaction occurs that produces a thin (.00002″ max.) gel-like, complex chromate film of a nonporous nature on the surface of the metal. This film is an integral part of the metal itself, thus cannot flake, chip or peel. No special equipment, exhaust systems or specially trained personnel are required.

If your company is manufacturing or buying parts or complete assemblies made from or plated with any of the more common non-ferrous metals—zinc, cadmium, aluminum, magnesium, silver, copper, brass or bronze—you've probably already run up against the question of finishing these surfaces with a chromate conversion coating. These coatings are used to protect against corrosion, or to provide a base for paint or to provide a decorative finish for sales appeal or shelf life. Since chromate conversion coatings represent a relatively new means of obtaining these finishes, this digest of facts to consider may be of value to you.

1. THE COATINGS THEMSELVES. There are many brands on the market. All are similar in many ways. Each, of course, offers its own specific advantages and these may relate to operating techniques, performance under actual use conditions, cost, availability, etc. Naturally, you'll want to choose a coating that is widely known and accepted under both military and civilian specifications.

2. THE COMPANY BEHIND THE PRODUCT. Is it a reliable, established organization? Does it offer experienced technical service, both from the field-engineering organization as well as the home office and laboratories? The man who sells and services your installation should be thoroughly familiar with not only chromate conversion coatings and their applications, but also with the characteristics and performance of related finishing operations such as precleaning, electroplating, painting, etc. This is most important since all steps of the finishing cycle must be functioning properly for the satisfactory performance of the ultimate finish produced.

3. AVAILABILITY OF THE PRODUCT. Ideally, of course, the material should be readily available to you from nearby warehouses to avoid time loss in long distance shipping and to provide emergency service, should the need arise.

4. COST. Naturally, the initial price of the material is important to you. However, just as you consider ultimate cost when you are buying mechanical equipment, ultimate cost must be considered for these finishing chemicals. So, it will pay you to investigate consumption costs, labor costs and the other factors which go into the determination of ultimate cost. Further, cost alone gives no indication of product performance, so careful attention must be given to the purpose the finish must serve and the value that finish will add to your product.

5. FACILITIES FOR RESEARCH AND DEVELOPMENT. Perhaps the existing types of chromate conversion coatings do not include a compound that will accomplish exactly what you wish. Then, it is important to deal with a supplier who has adequate research and development facilities available to work with you to produce a material to meet your needs. Naturally, such a project is seldom completed overnight. But, with complete cooperation and confidence from both you and your supplier, chances are a satisfactory program can be completed.

These are the concepts of sales and service on which we, Allied Research Products, Incorporated, have developed and marketed the line of Iridite chromate conversion coatings . . . superior product performance, complete sales and technical service, easy product availability, economical cost, extensive research and development facilities. No doubt you are familiar with our line and have seen this trademark—

IRIDITE®

—in our advertising, technical literature or on shipping containers in your plant. Remember this trademark when you're buying or investigating chromate conversion coatings for your company. It's your assurance of quality, economical products from a reliable and established company, skilled sales and technical service from both our home office and a national network of representatives, immediate availability from warehouses in strategic industrial areas and our willingness to work with you to develop new finishes to meet your needs, should the present line fall short.

For complete information on Iridite chromate conversion coatings, write today for your free copy of our technical data file. Or, for immediate advice, call in your Allied Field Engineer. He's listed under "Plating Supplies" in your classified telephone book.

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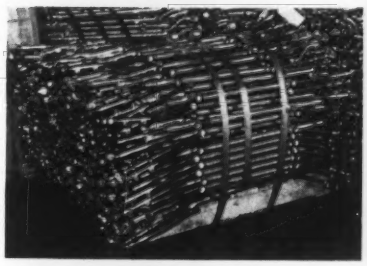
Manufacturers of Iridite chromate conversion coatings for corrosion resistance, paint systems, final finishing of non-ferrous metals; ARP Plating Brightener & Chemicals. West Coast Licensee—L. H. Butcher Co.



Even difficult-to-package items are received in palletized unit loads. These are steering bar parts

PALLETIZED HANDLING

sions accounting for 3100 lb.

Nationwide—Internal palletization is carried another step in the preparation of parts that are shipped to the seven Buick-Oldsmobile - Pontiac assembly plants across the nation.

They receive parts that are palletized just as Buick receives them from suppliers. The parts that Buick ships to other assembly plants are made at Flint. They include stampings, machined castings and plated parts.

Program—According to company engineers, the palletization program will be carried out as far as practicable internally and externally.

The program will require the use of a growing fork truck fleet. The plant has been plotted so that a truck will not carry a single load more than 300 ft from the central dock.

Truck Movement—Since the assembly plant, multistoried in some sections, is longer than a fifth of a mile and almost 400 ft wide, truck movement must be restricted to keep transportation economical. A truck would not be sent to far reaches of the plant, then deadhead on its return trip.

When parts must be carried to areas far distant from the dock, trains (a truck and five trailers) are loaded at the dock so that maximum volume is moved.

Unloading—At work stations, fork trucks place the pallets directly on gravity rollers or store the parts close by if conveyors are loaded. As each pallet slides down the rollers replacing an empty pallet, trucks will, even in passing, stop and reload the lines.

As each pallet is emptied, it is pulled off the conveyor and discarded beside it. All empty pallets are picked up throughout a shift and later examined to see if they are re-usable. Ultimately, all incoming pallets from suppliers are scrapped.

Flexible—While trucks normally are assigned to keep specific areas of the assembly line supplied at all times, the program is flexible

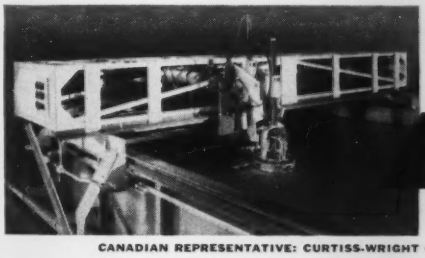
Six motors on two pallets are stacked in the motor storage area across the aisle from the motor assembly section

Finding the invisible with the inaudible

An engineer once said: "With ultrasonic inspection, you're finding the invisible with the inaudible."

Curtiss-Wright's Nondestructive Ultrasonic Test Equipment uses high frequency mechanical vibrations—far beyond the range of human hearing—for precision production-quantity inspection of forgings, rolled plate, welded tubing and other metal products. The "sound head"—immersed in water—sends vibrations that penetrate the metal under test and bounce back. Flaws show up on a cathode ray tube . . . and, simultaneously, a built-in alarm system sounds.

Curtiss-Wright Ultrasonic Inspection now controls quality for many leading producers in aircraft, steel, automotive, nuclear and other industries. Investigate its potentials for your production. Write for complete details.



Ultrasonic Immersion Test Equipment automatically scans wingskin plates for aircraft.

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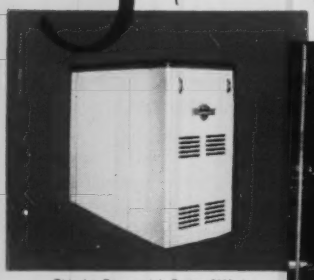
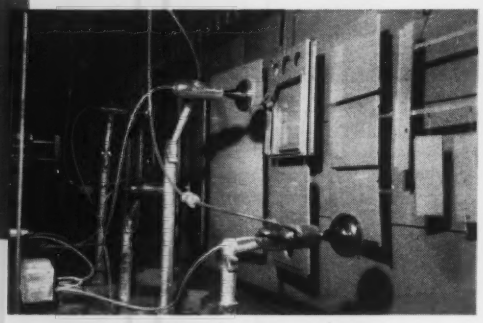
3 times as many Furnace Casings per gallon of paint with RANSBURG NO. 2 PROCESS!



This Lo Boy model, Series 6000, is typical of the Waterman-Waterbury line of winter air conditioners now painted electrostatically.



Quality of work is improved; Labor costs are cut and Production Stepped up 150% with

RANSBURG Electrostatic Spray Painting

Results exceeded expectations when Waterman-Waterbury, Minneapolis, modernized their finishing department and went from hand spray to Ransburg No. 2 Process in painting their quality line of heating and air conditioning equipment.

By the former hand spray method, W-W used a half gallon of paint to coat a single casing. Now, with Ransburg No. 2, they get SIX CASINGS PER GALLON . . . or 3 times as many per gallon. Furnace casings, as well as other painted parts which go into the famous Waterbury Furnaces, now get a uniform coating of .8-mil.

Production was increased, too, as automatic painting enabled them to step up the conveyor speed from 7 fpm to 11½ fpm. Where they formerly turned out a complete furnace in five minutes, NOW they assemble three in just six minutes . . . an increase of 150%. All in all, they figure the modernization program—with Electro-Coating—saved over $11,000 in the first three months of operation.

NO REASON WHY YOU CAN'T DO IT TOO!

Whatever you paint, we'd like to tell you more about the efficiencies and worthwhile savings which can be yours with Ransburg Electro-Coating Processes. Get our No. 2 Process brochure which cites many on-the-job examples of electrostatic spray painting on a wide variety of products. Or, we'll be happy to loan you our new film, "The Big Attraction" which tells the electrostatic spray painting story in sound and full color.

Call or write

RANSBURG
Electro-Coating Corp.
Barth and Sanders, Indianapolis 7, Indiana

Palletized loads of bumper back bar assemblies rest on gravity rollers within easy reach of the workers

PALLETIZED HANDLING

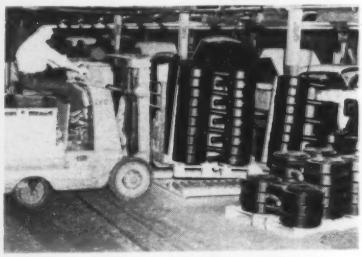
enough for trucks to be shifted to other parts of the line when an adequate supply of parts is to be sent to assigned areas.

The entire program of receipt and supply to the production line is based on the use of the fork trucks. Each Buick supplier must pack its parts so they can be received in unit loads from the first point of receipt to the ultimate delivery to the line.

It is necessary that these unit loads be on pallets which can be handled by fork truck. Pallets must be stackable in the comparatively small storage areas of each section of the assembly line for maximum utilization of space.

Electric Units—Since industrial trucks are the backbone of the program, Buick engineers have devoted much effort to keep them operating at peak efficiency. For the short level runs, the company prefers electrics. Of the 707 units operating throughout the plant, 86 per cent are so powered.

To maintain truck batteries, the fork lifts, when not in use between shifts, or for longer periods, are moved to the parking and battery recharging areas where they are connected to a power supply.



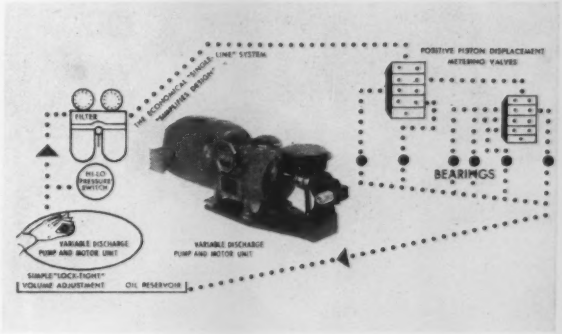
Elwell-Parker electric truck places pallet load of air filters on the floor roller conveyors

Lubrication System Has Adjustable Volume Control

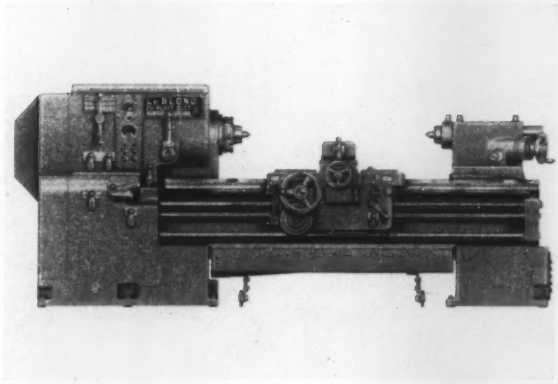
The Mark II Meterflo circulating oil system accurately proportions oil to any number of bearings on a machine. It features a variable discharge pump and motor unit.

Adjustable volume control is available in two ranges—from 5 to 30 and from 16 to 100 cu in. per minute—to meet various machine design and oil viscosity requirements, in winter and summer.

Distributor valves are the heart of the system. The progressive action of the pistons within these feeders guarantees a measured flow of oil to every bearing. Signals light when they do not. *Write*: Trabon Engineering Corp., 28767 Aurora Rd., Solon, O. *Phone*: Churchill 8-6151



Engine Lathe Designed for Ceramics and Carbides



The new 20-in., heavy duty unit is built to use 40 hp effectively. In the headstock, short, heavy shafts and fine-pitch gears deliver power to the spindle.

There are 36 speeds, from 10 to 1300 rpm in geometric progression. Selections are made in fine increments, particularly in the low speed range. The forged spindle is supported in three places by five bearings.

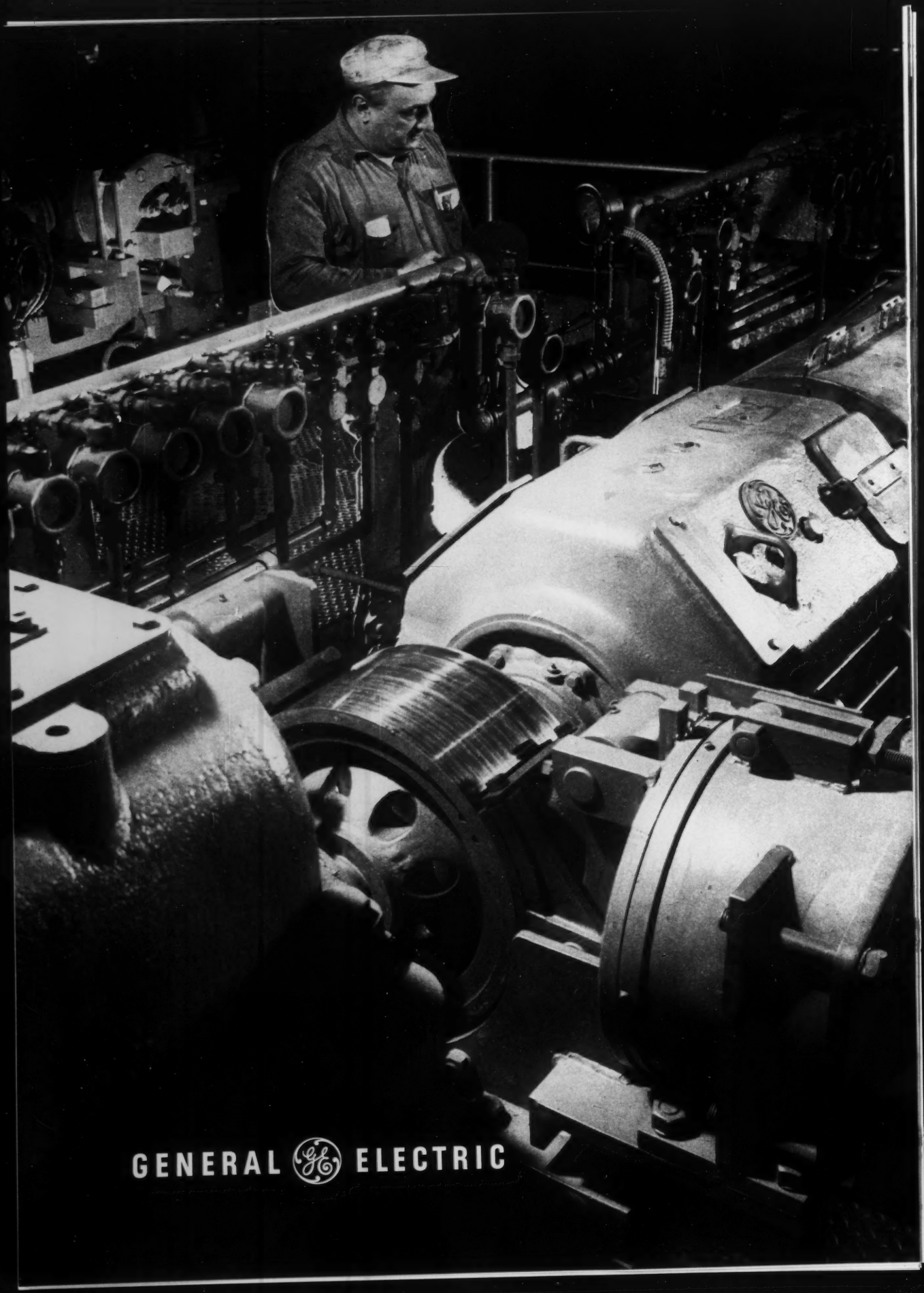
In the two-speed tailstock, spindle travel is geared for conventional or low speed. The tailstock can be moved by power. Other features: Replaceable steel ways; automatic lubrication to head, quick-change box and apron. *Write*: R. K. LeBlond Machine Tool Co., Madison and Edwards roads, Cincinnati 8, O. *Phone*: Jefferson 1-0910

Induction Furnace Features Electromagnetic Stirring

This 60-cycle melting furnace consists of a cylindrical induction coil surrounding a crucible shaped refractory lined hearth. Installed in the manufacturer's experimental foundry, it has given good results in production of high quality cast iron and in recovery of iron turnings and aluminum scrap.

Outstanding feature is vigorous electromagnetic stirring action in molten metal. This is particularly beneficial for fast, efficient melting of loose turnings and other fine scrap with minimum metal loss. The recovery of such scrap becomes economical.

The stirring action also aids in fast and uniform alloying and in closely maintaining alloy composition. The furnaces are offered in sizes from 1 to 10 tons, rated from 200 to 1500 kw. *Write*: Ajax Engineering Corp., Trenton 7, N. J. *Phone*: Export 3-7181


GENERAL ELECTRIC

Progress in Direct Current Drives . . .

NOW MD-600 Motors Meet AISE Standards In All Sizes

In steel mills, on cranes, on power shovels—on any application where severe operating conditions exist, General Electric's Armored Motors are on the job. *In all frame sizes*—402, 602 through 624, MD motors meet or better the high standards of the Association of Iron and Steel Engineers.

Where minutes mean money—In the process industries, any "downtime" can cause staggering losses. MD-600 motors have that *added protection* that gives steadier production—fewer unplanned shutdowns.

Class H insulated coils, standard in all MD-600 motors, give greater thermal protection, longer insulation life—an unmatched level of dependability. Insulation failure and motor roastouts have been virtually eliminated!

Specifically designed for the most rugged production applications, General Electric MD-600 motors provide high acceleration, deceleration and reversing to deliver peak horsepower faster and more efficiently. They will perform continuously under extreme strains of mechanical shock, high temperature and in the corrosive presence of dirt, steam and water.

Engineering help—If you would like to know more about the MD-600 motor line, we would be pleased to have a General Electric Industrial Specialist call on you. Or, if you prefer, we will send you copies of GEA-5654. Direct Current Motor and Generator Department, General Electric Company, Erie, Pennsylvania. 811-4

Progress Is Our Most Important Product

GENERAL ELECTRIC

NEW PRODUCTS and equipment

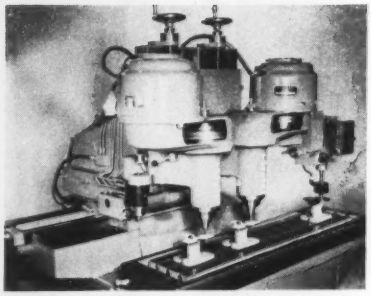
Hydraulic Router

The Hydro-Router is designed for intricate external and internal contouring at various depths. A dimensional tracing control can be added to provide a combination of profiling and contouring.

The tracer produces a 360-degree contour automatically through the rotating, magnetized stylus which clings to the template and requires a minimum of attention by the operator.

Since the saddle and ram are hydraulically actuated to provide the necessary machining movements and because the table is stationary, large workpieces can be set up to overhang the 56½ x 14½-in. table while ends or sections are machined.

The wide range of spindle speeds, 130 to 11,750, permits machining of tough, heavy metals and light, nonferrous metals. *Write*: Turchan Follower Machine Co., 26950 Van Born Rd., Box 6055, Dearborn, Mich. *Phone*: Webster 3-6484



CRANEMASTERS

. . . fill the bill for

CONTINENTAL CAN CO.

This 10-ton cab-operated *Cranemaster* is the first of two in service for Continental Can Co. Like so many other manufacturers, Continental Can Co. found Cranemasters *the top initial value* . . . with lasting satisfaction assured by Abell-Howe's years of experience in building overhead handling equipment that better *fills the bill* for industry of all kinds.

CAPACITIES TO 15 TONS —SPANS TO 60 FT.

CRANEMASTERS
FOR BETTER CONTROL OF COSTS!

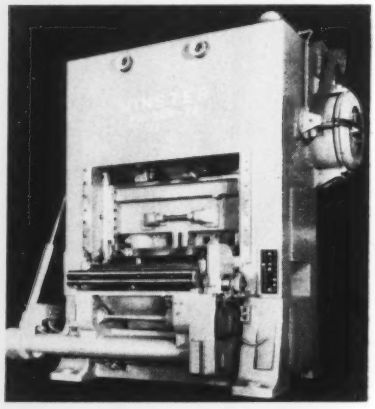
First, you save on Abell-Howe low engineering and production costs! Then you save on operating costs because of *Cranemaster* speed and dependability... and the precise control you need for the most demanding lifting-loading jobs.

Send For Bulletin C-110

7747 Van Buren Street **ABELL-HOWE COMPANY** Forest Park, Illinois

Center Drive Press

The 300-ton P2-300 two-point, straight side press for automatic progressive production is a single geared, center drive unit capable of operating at 75 to 150 strokes a minute with a standard 3-in. stroke.

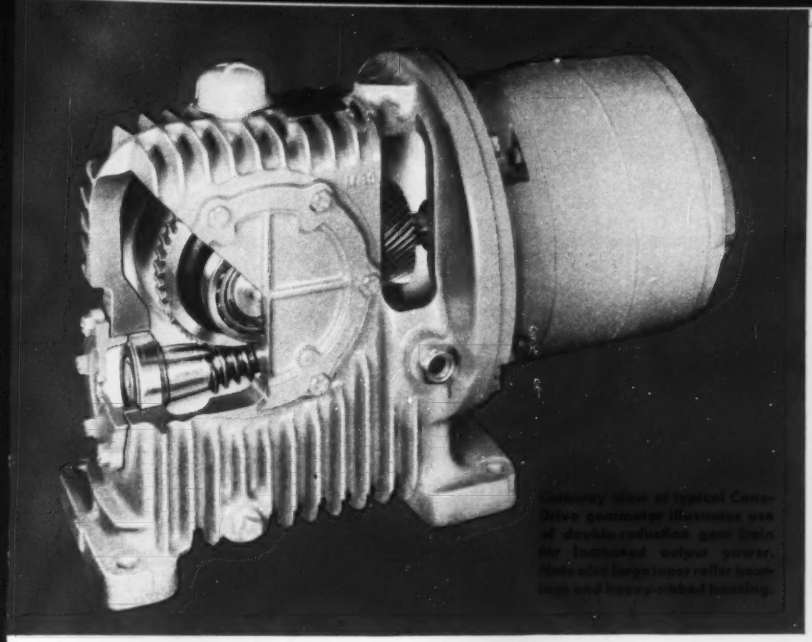


The speed range is made practical by mounting the steel herringbone main drive gear in the center of the two-point, full eccentric crankshaft. The gear is counterbalanced to equalize the weight of the crank eccentrics.

The press is available with bed widths of 66, 72 or 84 in. left to right and 48 in. front to back. *Write*: Minster Machine Co., Minster, O. *Phone*: Minster 194

Briquetting Press

Designed for making 2½ x 2½ x 14 in. zirconium briquettes, the press can be used for rectangular or square sections as well. The 500-ton die sealing ram permits the use of split dies and the easy removal of the briquette. The bed



Announcing a

POWERFUL NEW DRIVE

by

CONE-DRIVE GEARS

Here are the "why's" for this new gearmotor

Why a right-angle gearmotor?
You save space! By tucking the entire unit in close to the driven shaft, there's nothing to stick out in crowded aisles. It's out of the way.

Why a double-reduction design?
More power! Combining a helical primary with a Cone-Drive double-enveloping worm gear secondary gives you an extremely high load-carrying capacity. Output torque ratings are much higher than those of single reduction gearmotors. Overall ratios are greater, too.

Why double-enveloping worm gears?
More power! Cone-Drive double-enveloping worm gears have proven that they provide maximum load carrying capacity on extremely small center distances. This means, in many cases, that they will handle two to four times the load of cylindrical worm gears of the same size. An added plus is high resistance to shock loads, long operating life and minimum maintenance requirements.

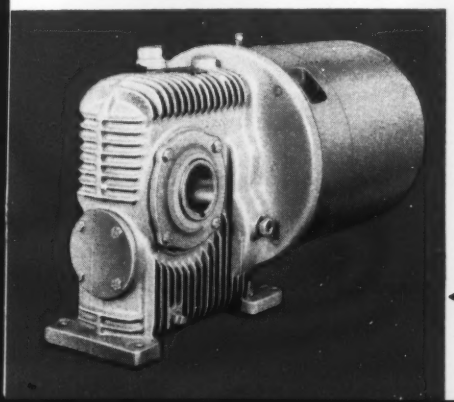
Why different types of mountings?
Flexibility! You can select Cone-Drive gearmotors with extended shaft or for shaft mounting. Both are standard. Shaft mounting often permits "hanging" the driven load on the gearmotor to eliminate pillow blocks, bearings, torque arms, shafts, pulleys, bed plates, etc. Both types may be floor, wall or ceiling mounted as desired.

Why 27 standard output speeds?
Standardization! Standard reductions range from 3.3:1 to 240:1. Speeds at 1750 rpm input range from 525 rpm to 7.3 rpm output speed. Any variation in input speed will naturally provide another complete set of 27 output speeds. Any standard type NEMA D-flange motor may be used. Other reductions may be obtained on special order at additional cost.

Why ratings to only 25 horsepower?
Demand! Extensive market research by Cone-Drive Gears reveals that this is the most popular power range in the application of gearmotors by industry. Currently we are building models in capacities from 1 to 25 horsepower. However the compact size and high capacity of the Cone-Drive gearmotor will extend this range in the future. Space requirements for higher capacities will be substantially reduced with our new design.

Why a Cone-Drive gearmotor?
Dependability! For over 20 years Cone-Drive Gears has been building double-enveloping worm gears and speed reducers. Design and manufacturing techniques have been constantly improved so that today these unique gears provide, size for size, the highest load-carrying capacity of any right angle worm gearing. Now, you can take advantage of this outstanding gearing combined into an integral package that eliminates pulleys, sheaves, belts, chain, bearings and all the trouble that goes with separate reducer and motor combinations. You'll get increased efficiency at lower cost by specifying standard Cone-Drive gearmotors.

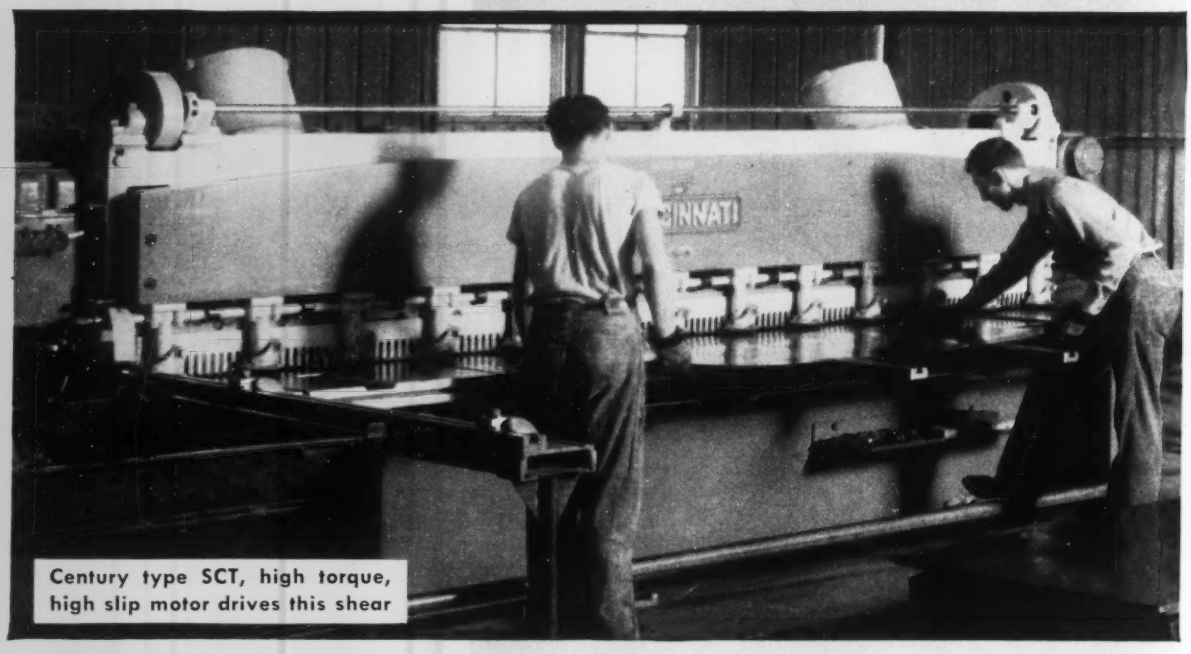
Bulletin #57 contains complete details. Ask for it today.



◀ Here's the finest shaft mounted gearmotor on the market today. It is available in all sizes with ratings identical to other Cone-Drive gearmotors.

CONE-DRIVE GEARS
Division Michigan Tool Company
DOUBLE ENVELOPING GEAR SETS & SPEED REDUCERS
7171 E. McNICHOLS ROAD • DETROIT 12, MICHIGAN

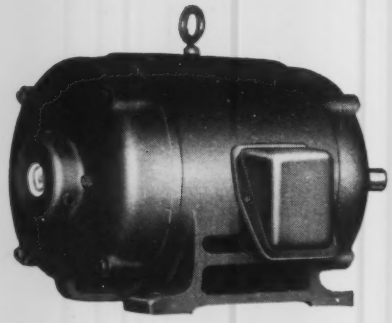
designed to absorb heavy peak load...



Century type SCT, high torque, high slip motor drives this shear

Century

Performance-Rated© MOTOR EXACTLY FITS THE NEED ON THIS SHEAR



To get full value from your equipment, motor *performance* must match machinery *requirements*. Whether the horsepower need is large or small, Century Performance-Rated Motors can supply the performance characteristics you require.

This shear has a Century Motor selected for proper size, speed, and torque with "high slip" characteristics. When the clutch is actuated, energy stored in the flywheel during the idle part of the cycle is used to drive the shear. As the load comes on, the motor speed pulls down—thus cushioning the shock of the load. This saves impact on the shear and motor, reduces power line surge and permits use of a Century Motor *Performance-Rated* to do the job without excess horsepower.

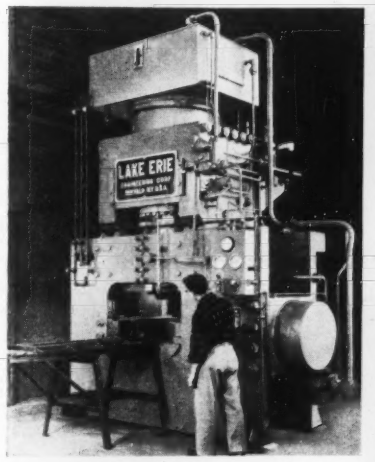
Century Performance-Rated Motors are designed in a wide range of torque, speed, mounting and frame characteristics. Call your nearby Century authorized distributor, or contact our District Sales Office.

Performance-Rated© MOTORS 1/20 to 400 H.P.

CENTURY ELECTRIC COMPANY

69-RR

1806 Pine Street, St. Louis 3, Missouri • *Offices and Stock Points in Principal Cities*



also has an opening through which material may be extruded.

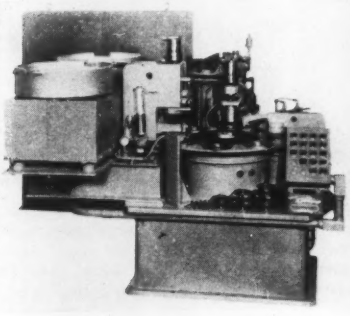
Vertical daylight is 22 in. with an 8 in. shut height. Horizontal daylight is 28 in., combined with a 6 in. ram stroke. Vertical platen is 30 x 34 in.

Closing speed of the vertical ram is 60 ipm, with a 5.4 ipm pressing speed. The horizontal ram closes and presses at 9.5 ipm. *Write*: Lake Erie Machinery Corp., 882 Woodward Ave., Buffalo, N. Y. *Phone*: Bedford 6900

Assembly Machine

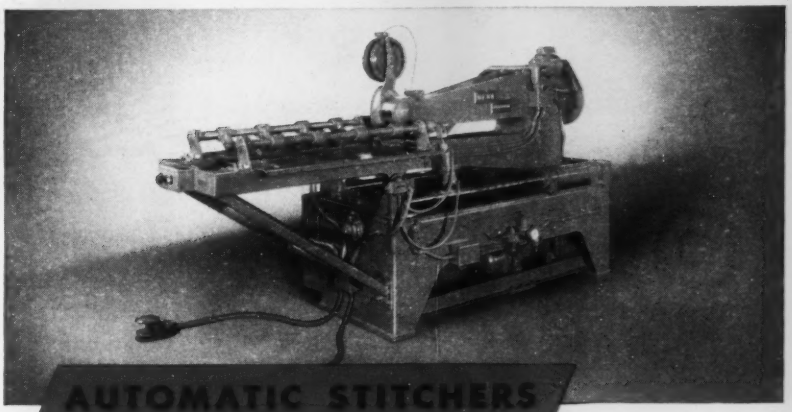
An 8-station unit automatically does multiple operations, including press-fit inspection, on automatic transmission gear assemblies.

Four pinions with needle bearings and spacers for each are assembled into the gear carrier and held in place with dummy pins. The assemblies are manually loaded into the machine. At the first station, permanent pins are fed from two vibratory hoppers, shuttled into position and pressed into the



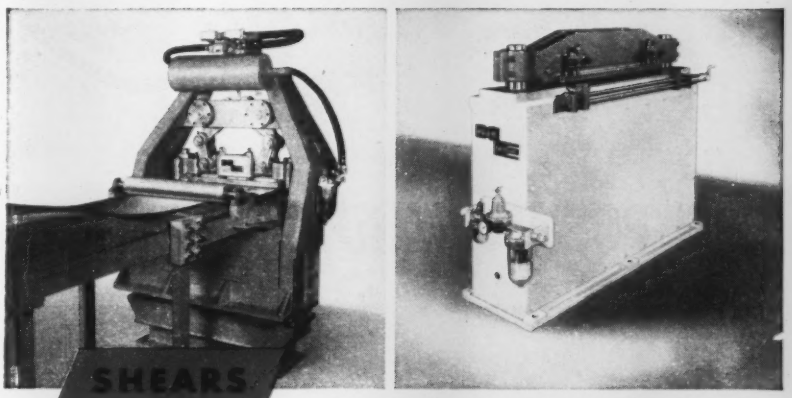
HERR EQUIPMENT

"Complete Processing and Handling Equipment . . . for any Ferrous or Non-Ferrous Material . . . That Starts — or Ends — as a Coil"



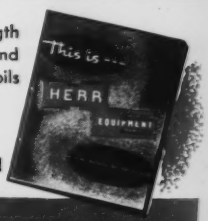
AUTOMATIC STITCHERS

Fast, dependable method of fastening the lead end of a new coil to the trailing end of a preceding coil. Entirely automatic. Produces a double row of locked stitches. Practical for strip of any width. Your samples stitched and returned promptly. Also automatic welders.



SHEARS

Fast acting single shears for use with hump tables in cut-to-length and press feed lines, and other applications to square crop the end of a coil. Also twin cut shears that remove the section where two coils were stitched or welded together for continuous processing.

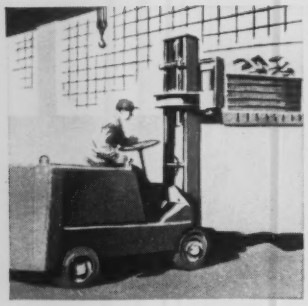


Write for fully descriptive Bulletin No. 561 today!

THE HERR EQUIPMENT CORPORATION

1250 VINE STREET • WARREN, OHIO

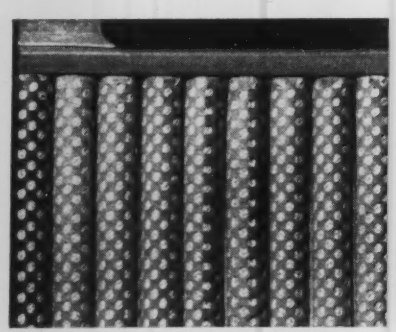
CLEVELAND, INDIANAPOLIS AND BERKELEY, CALIFORNIA



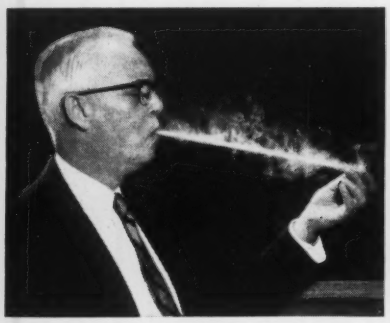
Get more work from your

NEW TG EXIDE-

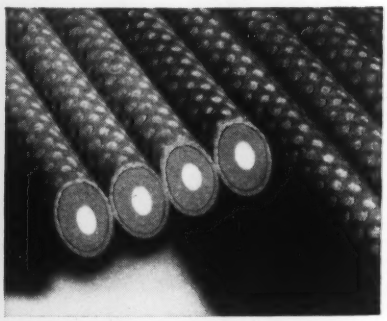
NEW POSITIVE AND NEGATIVE PLATES – DEVELOPED



New tubular construction of positive plate! Armored porous tubing. Provides resistance to corrosion and effects of vibration, improved flexibility, and maximum retention of active material. Thousands of tiny openings mean...



Greater porosity. Highly permeable tubes ease current flow, reduce internal resistance, improve access of electrolyte. Battery will deliver more power to meet sudden heavy loads. Tubes hold . . .



More active material. Chief source of battery power. Larger inside diameter of tubes means every positive plate contains more active material per cubic inch of plate. And for maximum capacity and long life, there's a . . .

electric industrial trucks

IRONCLAD BATTERY

Want more work hours—no increase in battery size? You get 44% more capacity in the new TG Exide-Ironclad Battery. For example, you can replace a 500 ah battery with a 720—in the same size. This means your trucks can do more work. They can earn a great deal more on your investment in them.

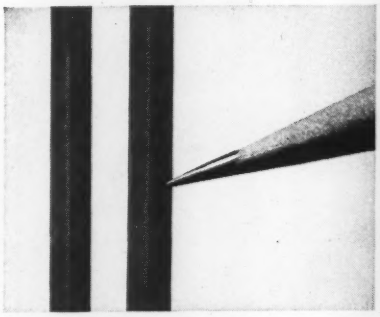
Satisfied with the work capacity of your present battery? Then get it at the lowest cost to own and operate—and get the newest, most advanced electric industrial truck on the market today.

Packs 44% more power into same battery space . . . priced to give you even greater battery economy

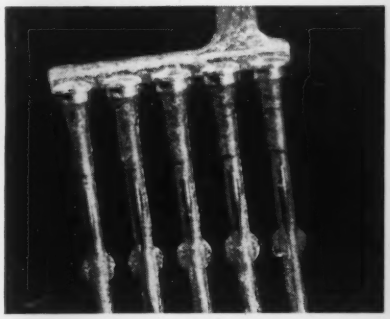
Want even lower operating cost and improved performance from your electric industrial trucks? Here Exide makes it possible. The new TG Exide-Ironclad Battery combines challenging new materials with an ingenious overall new design to produce the highest capacity per cubic inch of any battery available today. It's the most dramatic increase in capacity and the biggest step forward in power per dollar in history. This new battery can benefit every user of electric industrial trucks.

Learn more about the operating and expense advantages. Call your nearby regional Exide representative. Or write for complete information. Exide Industrial Division, The Electric Storage Battery Company, Philadelphia 1, Pa.

OUT OF RESEARCH STARTED 15 YEARS AGO



Thicker negative plate. Specially designed to match the increased capacity of the new positive plates. Plate is both thicker and stronger and possesses better electrical characteristics. You get all these advantages . . .



Plus Silvium,* Exide's exclusive grid alloy—proved more corrosion resistant than other leading grid alloys. Silvium is a patented combination of metals designed to prolong battery life. **U.S. patent*

Exide®

The Electric Storage Battery Company

assembly, forcing out the dummy pins.

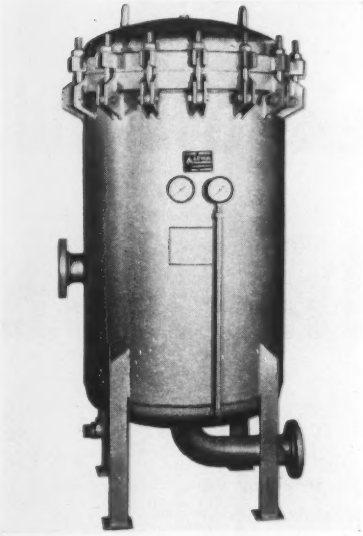
The next station checks the press fit of each pin, automatically informing a memory circuit if a pin does not resist a predetermined pressure. Defective assemblies are ejected automatically.

Acceptable assemblies continue to the next station where the pins are staked at each end to make a permanent assembly. *Write*: Omer E. Robbins Co., 24800 Plymouth Rd., Detroit 39, Mich. *Phone*: Kenwood 3-7902.

Lubricant Filter Shell

Any size or type of filter medium can be used with this shell for lubricants and coolants. The necessity of shell replacement and repiping are eliminated when changing from one type cartridge to another.

This is done with a special removable cartridge holder which can house any filter cartridge in use. The ease in removing and installing the holders reduces down time when a spare holder is used as a stand-by.



The shell is designed in all sizes for 125 psi ASME Code construction and can be used for flow rates of 20 to 900 gpm. It can handle viscosities of 32 to 900 SSU. *Write*: Alpha Tank Co. Inc., 1850 Steinway St., Long Island City 5, N. Y. *Phone*: Astoria 4-3700

Comparator Air Gage

The model L gage works on the back-pressure circuit principle. The unit consists of a filter, pressure regulator, pressure gage, an adjustable restriction unit and a gaging indicator. The indicator has

From first heat to heat treat . . .

LOFTUS

designs and builds them better

COVER TYPE
ANNEALING FURNACES

DIRECT-FIRED SINGLE-STACK
Generally Recommended
for
Greater Productivity per Investment Dollar
and
Flexibility with Economy

When warranted by special conditions, radiant tube or multiple stack construction are also available.

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Engineering Corporation
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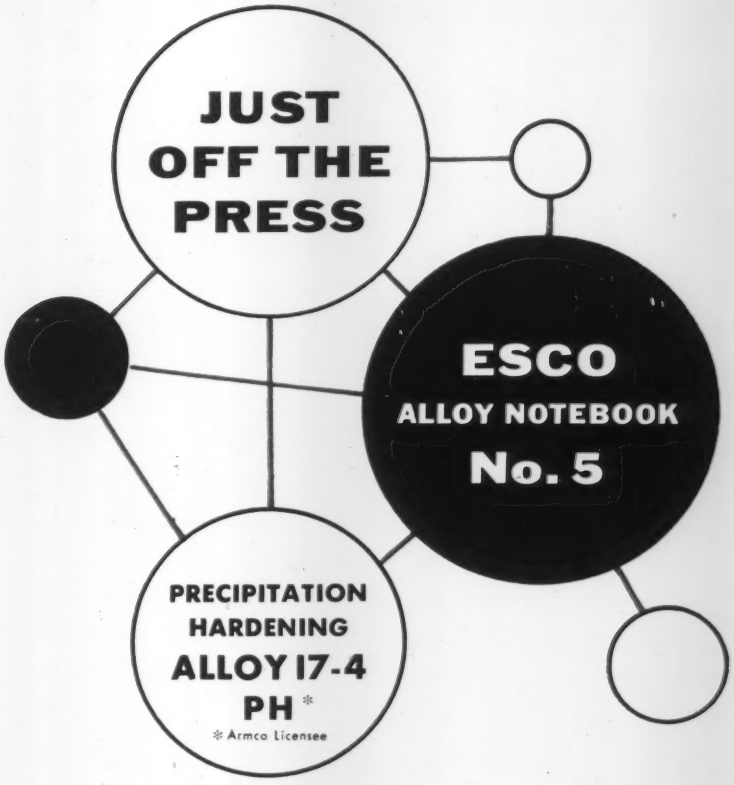
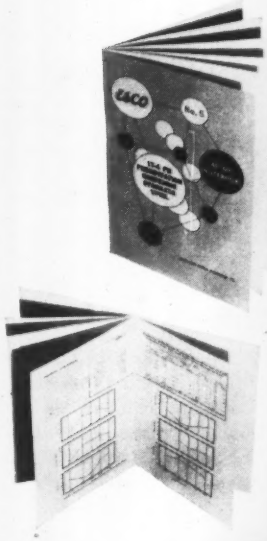
57.12.4





Here is the first information published on the mechanical properties after various heat treatments, of cast alloy 17-4 PH. This true heat and corrosion resistant stainless steel can be machined, in its relatively soft as-cast condition, and hardened to 400 BHN at low temperatures. 17-4 PH also has the ability, through heat treating, of being adaptable to a wide range of applications requiring high strength, ductility and impact resistance.

This report of a continuing study contains pictures, tables and graphs, showing such things as the microstructure before and after annealing and the comparative mechanical properties of 17-4 PH.

Industry as diversified as aircraft parts, food processing equipment and chemical pump manufacturers are among the enthusiastic users of Alloy 17-4 PH.

Write for your free copy today.

ESCO®

ELECTRIC STEEL FOUNDRY COMPANY

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MFG. PLANTS AT PORTLAND, ORE. AND DANVILLE, ILL.
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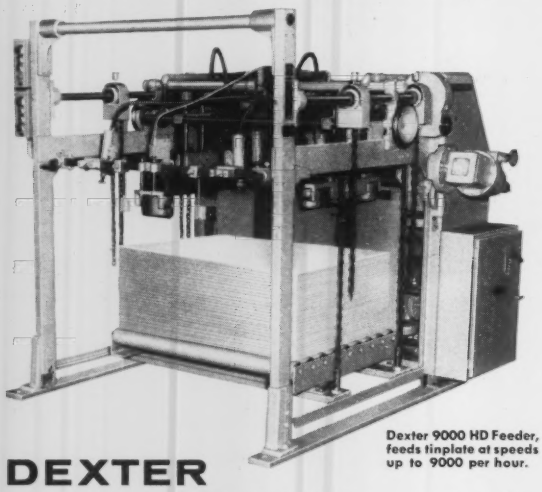
IN CANADA ESCO LIMITED

Automatic Feeding

FOR SHEET METAL PROCESSING



Dexter 9000 HD Feeder, feeds tinplate at speeds up to 9000 per hour.

DEXTER

automatic **METAL** *sheet feeders*

Dexter Feeders are available in over a hundred different sizes, speeds and load capacities to suit individual requirements. Look at the wide range of the Dexter Line . . . sheet sizes from 14x14" to four by twelve feet . . . sheet thicknesses from .006 to .200 . . . load capacities from 6000 to 30,000 pounds . . . and speeds from 600 to 9000 sheets per hour! Certainly there's a model that will fit your operation, and without doubt, step up your production.

Dexter Automatic Feeders can be attached to many types of equipment . . . Metal Decorators, Coating Machines, Shears, Slitters, Punch Presses, and numerous others.

If sheet feeding is one of your production bottlenecks, give us the details. We'll be happy to tell you what we can (or can't) do for you.

Designers of sheet handling equipment for over 75 years

DEXTER **FOLDER COMPANY**

DIVISION OF MIEHLE-GOSS-DEXTER, INC.

219 East 44th Street, New York 17, New York

NEW PRODUCTS and equipment

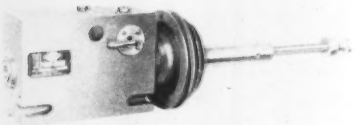
adjustable limit pointers and linear calibrated scales.

The high speed unit is instant and precise in action, and its regulator adjustment assures accurate control of pressure. The gage has steel, chrome plated and tungsten carbide gaging plugs which clean the work as gaging is done.

Standard gaging attachments for the model L are available. *Write*: Freeland Gauge Co., 9940 Freeland Ave., Detroit 27, Mich. *Phone*: Webster 3-7680

Hydraulic Borer

The S-6 weighs only 75 lb; it can be easily mounted on work-holding fixtures or assembly jigs. It is capable of boring within a tolerance of 0.0003 in. and producing a finish of 30 microinches. The No. 2 Morse taper on the spindle can be concentric or eccentric.

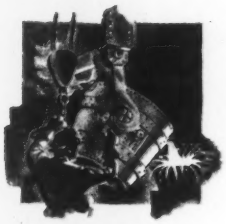


Its simple construction assures low maintenance. The machine consists of a cylinder housing and oil reservoir, two Meehanite bearings, boring spindle assembly, control valve and spindle drive assembly. *Write*: Greenlee Bros. & Co., Rockford, Ill. *Phone*: 3-4881

Metal Finishes

Iridite 5-P is a powdered concentrate which produces a yellow iridescent coating on zinc and cadmium plate, galvanized iron and zinc diecastings. The finish is corrosion resistant and makes a good base for paint.

Iridite 8-4 is an all-purpose liquid chromate for all forms of zinc and cadmium. It can be used to provide a bright finish at low cost, or, in applications where government specifications for supplementary chromate treatments must be met, it can provide a protective coating on zinc plate, cadmium



AMERICAN ORIGINALS IN IRON AND STEEL

The process that was born by accident

Pondering the possibilities of cold rolling one day back in 1860, Bernard Lauth* was observing a millworker snake hot iron bars between swift-turning rolls. Suddenly the worker's tongs were yanked from his hands and pulled through the rumbling mill.

Later on, as the story goes, Lauth recovered the flattened implement and was fascinated by the high luster given to the metal. In later experiments, he discovered that by cold rolling iron bars he achieved greatly improved accuracy, appearance and physical characteristics, including strength.

Thus, it was partly by accident that the cold-rolled process was born . . . the process that today is being so successfully applied to modern steels.

Baker's MAGDOLITE, likewise, was an important early discovery in the annals of iron and steel. And, year by year, continued research has improved this product. Today MAGDOLITE helps you to obtain more ingots and better furnace efficiency at lower refractory cost. Users tell us that Baker's MAGDOLITE is 5 ways better . . . in composition, preparation, strength, economy, and quality.

Don't say dolomite. Save dollars. Specify Baker's MAGDOLITE!

*Bernard Lauth was a partner of B. F. Jones, Sr., founder of Jones & Laughlin Steel Corporation.

ANOTHER AMERICAN ORIGINAL

JEBCO
PRODUCTS
SINCE 1889

BAKER'S MAGDOLITE
The original dead-burned dolomite

THE J. E. BAKER COMPANY

YORK, PENNSYLVANIA • PLANTS: BILLMEYER, YORK, PENNSYLVANIA • MILLERSVILLE, OHIO

plate, zinc base diecastings or galvanized steel.

Iridite 12-P is a powdered material for a one dip, blue bright finish on zinc plated parts. It can be used to replace conventional nitric acid dips or other mixes. It will produce a bright final finish when used in combination wth ARP Brighteners in the plating bath.

Iridite 14-9 is a powdered concentrate for a one dip, clear protective treatment of aluminum surfaces. A single dip provides good corrosion protection. *Write*: Allied Research Products Inc., Baltimore, Md. *Phone*: Peabody 2-9070

Floor Machines

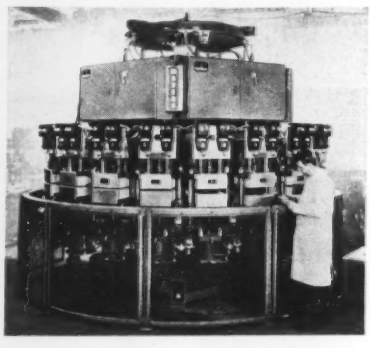
The series 900 machines are for scrubbing, shampooing, stripping, polishing, steel wooling, sanding and terrazzo grinding. Models are available with 14, 16, 18 and 22-in. brushes.

Features of the line include an underhandle cable connection, dual switch controls at the handle, reversible motors and a shaft extension for easier retraction of the nonmarking Neoprene wheels. All machines have white vinyl bumpers at the edge of the brush housing cover to prevent scuffing and marking of furniture and equipment.

A 1/3-hp motor operates the 14-in. machine; a ½ or ¾-hp motor is available for the 16-in. unit; a ¾-hp motor powers the 18-in. machine; and a 1-hp motor drives the 22-in. unit. *Write*: Breuer Mfg. Co., 5100 N. Ravenswood Ave., Chicago 40, Ill. *Phone*: Longbeach 1-6162

Rotary Bonding Machines

This line is offered in a capacity range from single and multistation types up to 40-station rotary types. The machines are for permanently bonding (with a commercial adhesive) liners to internal or external surfaces. Uses include bonding of automatic transmission parts and brake-band linings or other air-

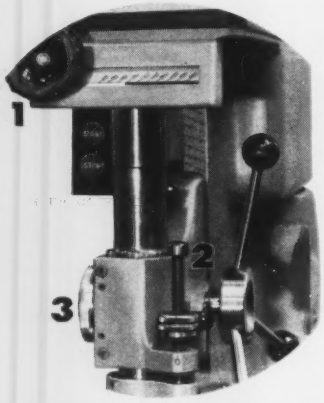


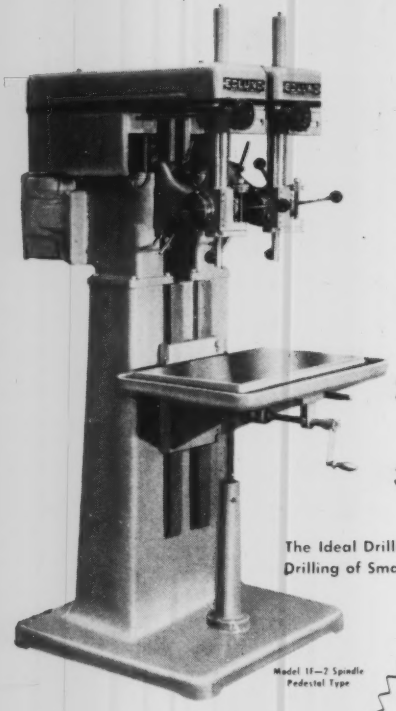
EDLUND Sensitive Drilling Machine

MODEL 1F

Infinitely Variable Speed

10,000 R.P.M.





1 INFINITELY VARIABLE SPEED CONTROL
Simply turn knob for any speed within range of the machine. Swift, powerful, and positive action.

2 MICROMETER GRADUATED DEPTH GAUGE
Permits accurate pre-set depth control for all precision production drilling. Clearly graduated to .001

3 ADJUSTABLE SPINDLE TENSION CONTROL
Compensates for different drilling conditions. Three handle feed lever reduces worker fatigue.

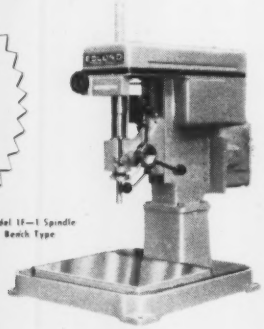
The Ideal Drilling Machine for High Speed Sensitive Drilling of Small Parts, Light Assemblies, and Instrumentation.

Model 1F—2 Spindle Pedestal Type

America's Most Popular Drilling Machine

SPECIFICATIONS

Overhang 7"
Capacity (Cast Iron) ½"
Jt Morse Taper or Jacobs Chuck 0-½
Speed Range — Optional
625 to 5000 RPM
1250 to 10000 RPM
Spindles — 1 to 6
Pedestal and Bench Types

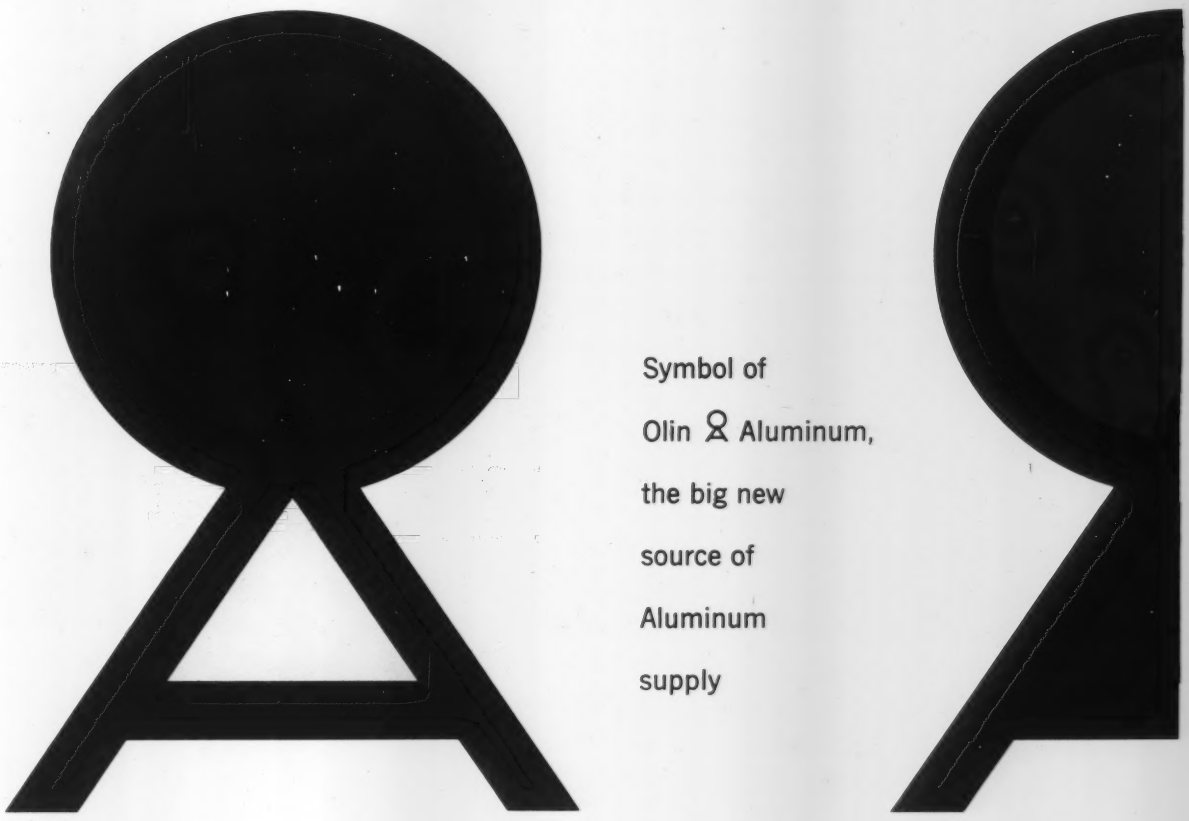


Model 1F—1 Spindle Bench Type

Send for Free Illustrated Bulletin 2160

EDLUND MACHINERY COMPANY
Cortland, New York
Division of Harsco Corporation

EDLUND REPRESENTATIVES IN MAJOR CITIES



Symbol of
Olin Aluminum,
the big new
source of
Aluminum
supply

OLIN ALUMINUM brings you an important new concept of

Quality and Service designed to cut your manufacturing costs

Olin Aluminum is already being produced at four locations. Soon, backed by a multi-million dollar investment and the extensive experience of Olin Mathieson Chemical Corporation in the non-ferrous metals field—Olin Aluminum's new, ultra-modern facilities will be ready to produce an initial annual volume of more than 240 million pounds of fine Aluminum.

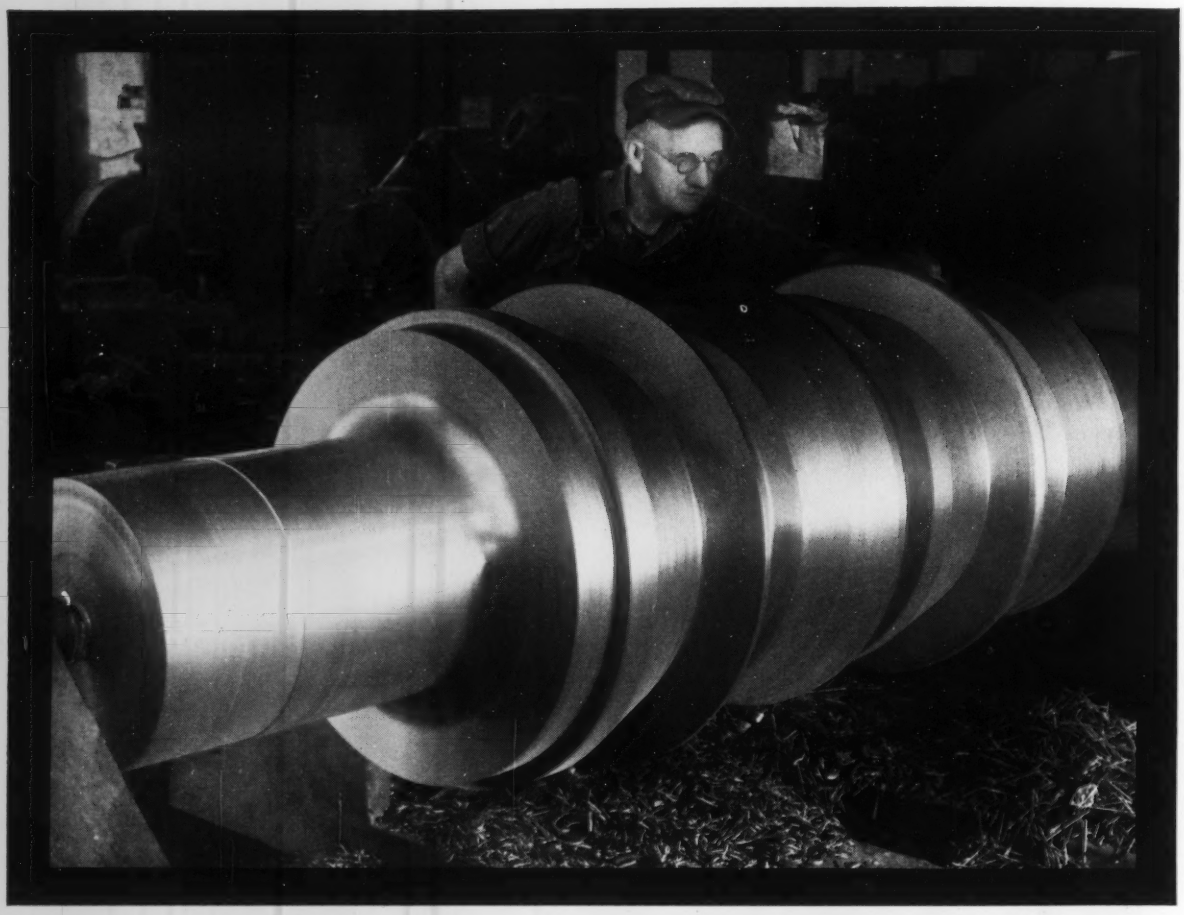
The full integration of these new facilities—complete from ore ships to Alumina Plant, Reduction Plant, Rolling Mills and Extrusion Plants—will assure dependable delivery of Olin Aluminum to you. And the advanced technology and design of these facilities plus the experienced skill of the men who will operate them will mean competitively superior metallurgical quality, tolerances and finish for every user of Olin Aluminum.

That is Olin Aluminum's new concept of Quality and Service: fine Custom-Made Aluminum so tailored to your individual needs that it will save you manufacturing operations...delivery and service so dependable that costly delays will be eliminated...and technical assistance so thorough and imaginative that it will assure you maximum economic use of every ounce of Aluminum.

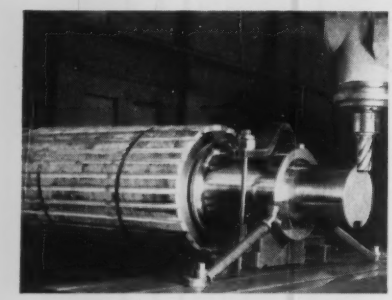
The men from Olin Aluminum are already making calls on industry. Soon they will be coming your way. Meanwhile, we cordially invite your inquiries. Write to: Aluminum Division-Sales, Olin Mathieson Chemical Corporation, 460 Park Avenue, New York, 22, N. Y.

OLIN ALUMINUM

AND "OLIN ALUMINUM" ARE TRADEMARKS COPYRIGHT 1957, OLIN MATHIESON CHEMICAL CORPORATION



Roll Turning—a Master's Art at BIRDSBORO



FINISHING SCHOOL for rolls at Birdsboro is the series of final machining operations performed to meet customer specifications. And no detail, down to the protective shipping crate, is left to chance.

Even though this man is only part of the large crew whose work has gone into this roll, he takes infinite care . . . for he knows that only the best possible craftsmanship will be accepted by his foreman. And it's the same in Birdsboro's research laboratories, as well as in the roll foundry. The results can be measured in your mill when you use Birdsboro's specialized family of steel, alloy iron, and alloy steel rolls, each member capable of meeting specific rolling requirements and taming temperamental hard-to-roll steels: IRON BASE ROLLS—Grainloy, Birdsboro Metal, Curoloy, Superloy, Super Curoloy; STEEL BASE ROLLS—Diamondite, Birdsboro Special, Birdsboro 30, 40, 50 and 75. Main office and plant: Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., District Office: Pittsburgh, Pa., Subsidiary: Engineering Supervision Co., 120 W. 42nd St., New York 36, N.Y.

R-20-57

BIRDSBORO
STEEL FOUNDRY AND MACHINE CO.

STEEL MILL MACHINERY • HYDRAULIC PRESSES (Metalworking and Extrusion) • CRUSHING MACHINERY • SPECIAL MACHINERY • STEEL CASTINGS • "CAST-WELD" Design • ROLLS: Steel, Alloy Iron, Alloy Steel

craft or automotive components.

Pressure, time and temperature for any bonding method can be controlled.

A single station model produces 10 parts an hour; a 40-station unit about 400. *Write*: Modern Industrial Engineering Co., 14230 Birwood Ave., Detroit 38, Mich. *Phone*: Webster 3-7280

Induction Heating Table

This self-contained, two-station worktable is for hardening, brazing, annealing and soft soldering operations. Standard units are equipped with 220/440, 3-phase, motor-generators with ratings of 7½ to 30 kw.

The worktable has an output of 220 volts, 10 kc, single phase. It is equipped with volt, ampere, kilovolt-ampere and kilowatt meters. Lights indicate "heat on" and "generator on."

Dimensions: 40 in. wide, 56 in. long. Over-all height is 63 in. Work area height is 40 in. *Write*: Welduction Corp., 10230 Capital Ave., Detroit 37, Mich. *Phone*: Jordan 4-6768

Hi-Temp Masking Tape

Scotch brand No. 214 is an improved tape with better resistance to adhesive transfer and easier removal properties. It can be used up to 300°F for bakes up to 8 hours. It will withstand shorter heat cycles up to 400°F.

The tape has crepe paper backing and pressure-sensitive adhesive. It can be used to mask treated and plain metal surfaces.

It has a tensile strength of 20 lb per inch of width, an adhesion to steel of 25 oz per inch of width. Elongation is 9 per cent. It is 8 mils thick. *Write*: Department L7-132, Minnesota Mining & Mfg. Co., 900 Bush St., St. Paul 6, Minn. *Phone*: Prospect 6-8511

Masonry Color Finishes

Color Coat 261 will stick to and cover black bituminous coatings, concrete, brick, cinder block, porous roofing tile, asbestos shingles, stucco and properly primed wood and metal. Drying time is about 30 minutes.

A modified acrylic resin dispersion combined with chemically inert pigments, the coating leaves a tough pigmented plastic film that flexes with expansion of base material. It shows good resistance to sunlight, gases, corrosive fumes, cleaning compounds and many solvents.

Color Coat 261 is available in rose, light green, light blue, light

Guaranteed A 20% REDUCTION IN LOSSES IN PRESS ROOM OPERATIONS!

PP PIVOT PUNCH & DIE CORPORATION

CABLE ADDRESS: PIVOT NORTH TONAWANDA, NEW YORK [Archaeo 1200

Mr. Manufacturing Manager
Profit Conscious Corporation
Any Old Street
Efficientown, U. S. A.

Dear Mr. Manager:

During the next few months you will be hearing from me quite a bit. Why? Because we have a story to tell you which if adopted will guarantee up to a 35% savings in your stamping operations. Here's what we will do for YOU.

1. Reduce your replacement punch usage; where 50 punches might be required, only 10 or 20 Pivot punches can accomplish the same job.

2. Your die maintenance costs will be reduced by at least 30%.

3. Your press downtime with the use of our punches, if proper punch and die alignment exists, can be reduced by 50%.

Several of the largest manufacturers in the country have standardized on these punches and are increasing their profits. Why don't you find out about our patented straight ground punches now and affect these savings immediately. Simply have your secretary drop me a note.

Sincerely,

PIVOT PUNCH & DIE CORPORATION

John F. Bergmann
Sales Manager
Punch Division

JFB:lz

MADE TO FIT YOUR ENGINEERING STANDARDS

* Above is an actual reproduction of a letter we have sent to several hundred manufacturers. We apologize if it has not reached your desk, and we invite you to take advantage of this offer. Just drop us a note for complete information.

tondra-treated FOR EXTREME HARDNESS

WRITE FOR COMPLETE CATALOG WITH PRICE LISTS

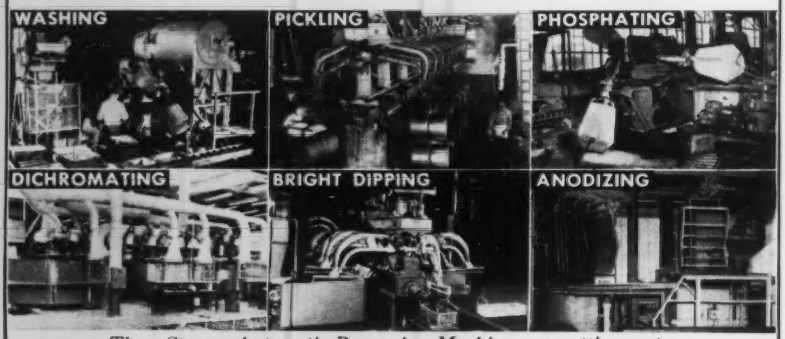
PIVOT PUNCH and DIE CORPORATION
NORTH TONAWANDA, NEW YORK

THE FINISHING TOUCH

A. B. HOEFER, *Vice-President*, FREDERIC B. STEVENS, INC.

AUTOMATIC IMMERSION PROCESSING RESULTS IN REAL SAVINGS!

MORE AND MORE, PROCESS ENGINEERS are recognizing the money savings to be realized from automatic processing installations, i.e. *Anodizing and other aluminum immersion treatments; Blackening; Bright Dipping; Dichromating; Cleaning; Pickling; Washing; Phosphating* for rust prevention; wear resistance, and prior to cold drawing; *Stripping* as well as *Electroplating.*



These Stevens Automatic Processing Machines are cutting costs.

"PROFIT-MAKING MACHINES" was one term recently used by a Stevens Automatic Machine user. Money saved in labor, floor space, production control and similar costs, if tacked on the other end, could very easily be termed "profit."

IN ANALYZING AUTOMATIC MACHINE USERS at Stevens for the past three years we were interested in the increased number of processing applications which manufacturers are adapting to this versatile equipment.

AUTOMATION HAS INFLUENCED THESE INCREASES, for our automatic machines fit ideally into "straight line" production layouts and eliminate handling and human error so costly in today's modern manufacturing techniques. All of our machines can be equipped with automatic load and unload features and have flexibility which enables them to be used for a variety of metal treatments.

IF YOU ARE A PROCESS ENGINEER, or occupy a similar post of responsibility in your plant, contact your Stevens sales engineer or write for more information on automatic immersion processing as well as electroplating. Let us show you how you can recommend methods to save your company money. Write: Frederic B. Stevens, Inc., 1800 Eighteenth Street, Detroit 16, Michigan.

FREDERIC B. STEVENS INCORPORATED
YOUR METAL FINISHING SUPERMARKET
DETROIT 16, MICHIGAN

STEVENS 75 YEARS OF SERVICE

WAREHOUSES AND OFFICES IN PRINCIPAL CITIES

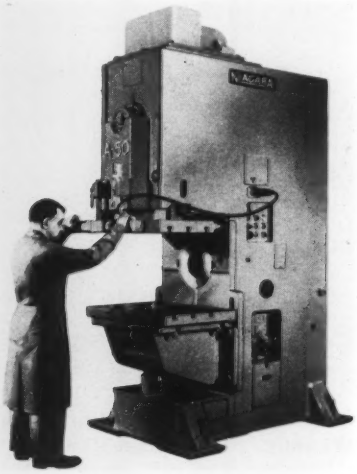
NEW PRODUCTS and equipment

yellow, light buff, light gray, dark gray and white. *Write*: Department B-53, Insul-Mastic Corp. of America, 7750 W. 61st Place, Summit, Ill. *Phone*: Globe 8-1616

Adjustable Bed Presses

Modernized and redesigned, these presses are equipped for secondary operations between automated presses in the production line.

There are no overhanging or protruding components. The operator's panel, auxiliary power supply, flywheel brake operating lever and safety block are recessed into the right side. On the opposite



side, a flush panel door conceals the automatic oil circulating system. Housed in back are the air control and motor-press control panels.

The machines are designed for easy portability. They can be hoisted or readily moved on their skid type feet. *Write*: Niagara Machine & Tool Works, 683 Northland Ave., Buffalo 11, N. Y. *Phone*: Taylor 4070

In-Line Transfer Machines

This 11-station machine does nine drilling, reaming and milling operations on automotive pistons. It is capable of machining 650 an hour at 100 per cent efficiency.

Pistons are delivered to the first station by a conveyor where they are automatically accepted and loaded into the machine. Station-

Save by using specialized refractories

Many refractories problems in metal-working furnaces have been solved *economically* by the use of B&W specialized refractory castables. Each ferrous or non-ferrous furnace application requires a specific combination of properties to meet the service conditions. Whether your problem is high temperatures, abrasion and erosion, slag attack or the need for insulation, to name a few, you will find the refractory castable best suited to your requirements in B&W's line. Shown here in digest form are data on the widely used B&W refractory castables for metal-working furnaces:

B&W Refractory Castables for Metal Working Furnaces

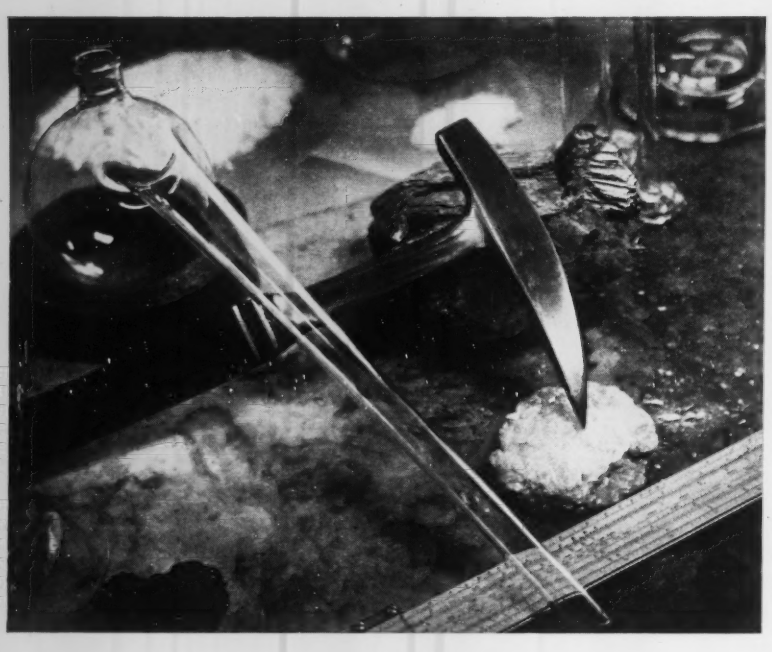
	Temp. F	PROPERTIES	TYPICAL APPLICATIONS
B&W Kaocast	3000	**High resistance to spalling and slag attack. Low volume change and negligible reheat shrinkage.**	**Soaking pit covers, linings of high temperature heating and forging furnaces, burner blocks, electrode linings of electric furnace roofs, linings of non-ferrous metal furnaces.**
B&W Kaocrete 32	3200	High strength, exceptional refractoriness, unusual volume stability, excellent resistance to spalling.	Can be used in applications similar to those of B&W Kaocast and where higher refractoriness is required.
B&W Kaocrete D	2500	**Sufficient strength and hardness to withstand abrasion, considerable physical abuse and erosion.**	**Aluminum melting furnaces, linings and car tops in heat treating furnaces, as well as in sections of a wide variety of furnaces that are subject to scraping by hand tools or other mechanical abuse.**
B&W Kaocrete A	2600	Resists reducing atmospheres. Has good resistance to erosion, abrasion and thermal shock.	Annealing furnace bases and other applications where resistance to reducing atmospheres is essential. Also as a general purpose castable for linings in medium temperature service.
B&W Kaocrete B	2300	**Has an adhesive plastic texture particularly suited for vertical or overhanging constructions. Excellent for plastering.**	**Patching linings and baffles and for any application where plastering rather than gunning or casting is required.**
B&W Kaocrete LI	2700	High alumina content, exceptionally high strength for resistance to abrasion and erosion.	Aluminum furnace linings where high alumina content is important.
B&W Kaolite 20	2000	**Offers castable's fast, low cost installation plus insulation. Has refractoriness, light weight and low heat conductivity and, in addition, will resist reducing atmospheres. Can be poured or gunned.**	**Aluminum melting, heating and heat-treating, annealing and forge furnaces. Also for general maintenance and patching.**
B&W Kaolite 22	2200	**Has the same properties as B&W Kaolite 20. Can be used for higher temperatures but not in reducing atmospheres.**	

Send for your copy of B&W Bulletin R-35. It gives additional information on B&W's versatile refractory castables.

B&W REFRACTORIES PRODUCTS: B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick • B&W Refractory Castables, Plastics and Mortars • B&W Silicon Carbide

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 161 EAST 42nd ST., NEW YORK 17, N.Y.
WORKS: AUGUSTA, GA.



THE HAMMER
AND THE RETORT

As the geologist's hammer signifies the mineral wealth locked in the earth's crust, the chemical retort signifies the power to free that wealth for the benefit of mankind. Together, the hammer and the retort symbolize the marriage of geology and chemistry that is the tradition and the future of the Foote Mineral Company.

Founded eighty years ago as a supplier of mineral products, Foote has expanded constantly, until now its business includes mining, mineral and alloy processing, chemicals, and metals. And the pioneering done by the company in the extraction and application of many lesser known elements has contributed substantially to many important technological advances.

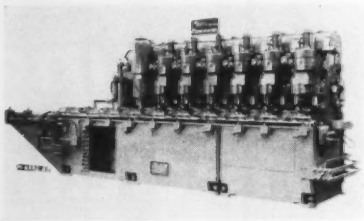
Foote Mineral Co., 411 Eighteen West Chelten Building, Philadelphia 44, Pennsylvania.

Foote MINERAL COMPANY

RESEARCH LABORATORIES: *Berwyn, Pennsylvania*
PLANTS: *Cold River, N.H.; Exton, Pa.; Kings Mountain, N.C.; Knoxville, Tenn.; Sunbright, Va.*

LITHIUM CHEMICALS, MINERALS, METALS • STRONTIUM CHEMICALS • ELECTROLYTIC MANGANESE METAL • WELDING GRADE FERRO ALLOYS • STEEL ADDITIVES • COMMERCIAL MINERALS AND ORES • ZIRCONIUM, TITANIUM, HAFNIUM (IODIDE PROCESS)

NEW PRODUCTS and equipment

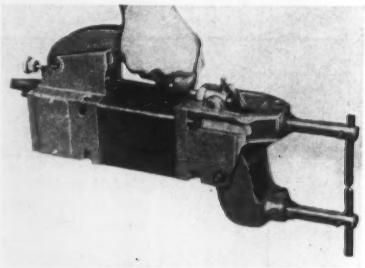


to-station transfer is done by hydraulically operated transfer fingers and a reciprocating transfer bar.

When the piston reaches the eleventh station, chips and coolant are dumped, and the part is automatically unloaded to a conveyor. *Write*: Motch & Merryweather Machinery Co., 888 E. 70th St., Cleveland, O. *Phone*: Utah 1-1515

Spotwelder

The P-166A features high welding current for its size, easy one-hand operation and adjustable spring pressure.



An additional convenience is a built-in "trip switch." *Write*: Aro Spot Welders Division, Guthery Machine Tool Corp., 38-31 Crescent St., Long Island City 1, N. Y. *Phone*: Exeter 2-4090

Battery-Powered Tractor

A compact unit that can be used for pulling and pushing in confined areas has been added to the Powrworker line of hand trucks.

It has a normal draw bar pull of 200 lb and a breakaway rating of 700 lb. It has two speeds in forward and reverse and will travel 2 mph fully loaded, 3.2 mph empty. Fingertip control levers are on the steering handle.

Two models are available: The PT-S, for single row battery, is 39¼-in. long, less coupler. The

39 Sources

...ONE NEAR YOU FOR FAST SERVICE

PHEOLL MANUFACTURING CO.
Chicago 50, Illinois

PITTSBURGH SCREW & BOLT CORP.
Pittsburgh 33, Pennsylvania

PROGRESSIVE MANUFACTURING CO., DIV. OF TORRINGTON CO.
Torrington, Connecticut

RELIANCE DIVISION, EATON MANUFACTURING CO.
Massillon, Ohio
London, Ontario

REPUBLIC STEEL CORP.
Bolt & Nut Division, Cleveland 13, Ohio

RING SCREW WORKS
Van Dyke, Michigan

P. L. ROBERTSON MFG. CO., LTD.
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ROCKFORD SCREW PRODUCTS CO.
Rockford, Illinois

RUSSELL, BURDSALL & WARD BOLT & NUT CO.
Port Chester, New York
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Rock Falls, Illinois

SCOVILL MANUFACTURING CO.
Waterville Division, Waterville 48, Connecticut

SEMS DIVISION, TEXTRON INC.
Rockford, Illinois

SHAKEPROOF DIVISION, ILLINOIS TOOL WORKS
Elgin, Illinois

SOUTHINGTON HARDWARE MFG. CO.
Southington, Connecticut

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THOMPSON-BREMER & CO.
Chicago 22, Illinois

TRIPLEX SCREW CO.
Cleveland 9, Ohio

UNITED SCREW & BOLT CORP.
Chicago 8, Illinois

WALES-BEECH CORP.
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THE BLAKE & JOHNSON CO.
Waterville 14, Connecticut

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Altoona, Pennsylvania

CANADA ILLINOIS TOOLS LTD.
Toronto, Ont., Canada

CENTRAL SCREW COMPANY
Chicago 9, Illinois
Keene, New Hampshire

CLEVELAND CAP SCREW CO.
Cleveland 4, Ohio

CONNECTICUT SCREW & RIVET CO., INC.
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CONTINENTAL SCREW CO.
New Bedford, Massachusetts

ECONOMY SCREW CORP.
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ELCO TOOL & SCREW CORPORATION
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INDIANA METAL PRODUCTS DIVISION, TEXTRON INC.
Rochester, Indiana

LAKE ERIE SCREW CORP.
Cleveland 7, Ohio

THE LAMSON & SESSIONS CO.
Cleveland 2, Ohio

MIDLAND SCREW CORP.
Chicago 32, Illinois

NATIONAL LOCK COMPANY
Rockford, Illinois

THE NATIONAL SCREW & MFG. CO.
Cleveland 4, Ohio
Los Angeles 22, California

PARKER-KALON DIVISION, GENERAL AMERICAN TRANSPORTATION CORP.
Clifton, New Jersey

When ordering Sems, specify SHAKEPROOF® Lock Washers, specifically designed for a perfect match.

pre-assembly...

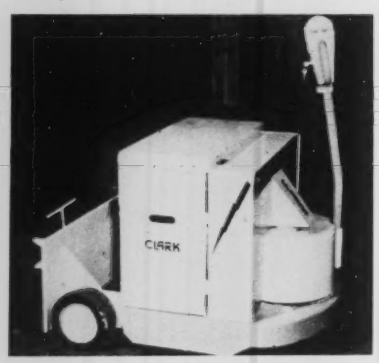
reduces handling...saves time and money

Sems fasteners are pre-assembled to cut wasteful hand operations in mass-assembly production. Washers can't be lost or forgotten and rejects due to mismatched screw and washer are stopped. Often hopper-fed for automatic driving, pre-assembled Sems are a first step in automation.

Sems

SEMS is a development of Illinois Tool Works, Chicago itw

NEW PRODUCTS and equipment



PT-D, for double row battery, is 44⅝-in. long, less coupler. Width of each model is 32 in. *Write*: Powrworker Division, Clark Equipment Co., Battle Creek, Mich. *Phone*: Woodward 2-6561

Steel Buildings

These rigid frame, straight sidewall buildings can be used as warehouses, manufacturing plants or auxiliary facilities. Standard widths are 40, 50 and 60 ft. They can be built in any length, in multiples of 20 ft.

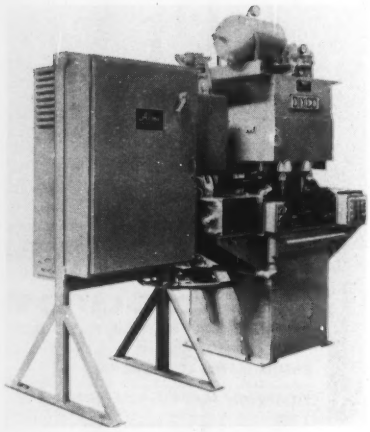
The design features an unobstructed interior, tapered rigid frame construction and strength which meets code requirements for wind and snow loads.

Structural design and details are pre-engineered; only size, arrangement and accessories need be specified. *Write*: Metal Buildings Division, Inland Steel Products Co., P. O. Box 393, Milwaukee 1, Wis. *Phone*: Evergreen 3-4030

Stud Welder

An automated, four-stud projection welder improves efficiency and reduces the cost of manufacturing automatic transmission parts. It holds tolerances on the studs to ±0.012 in. between centers.

An automatic unloading and part turnover device feeds the welded part to the inspection station prior to machining. Rated output is 180 parts an hour at 80 per cent efficiency.



The welder is rated at 260 kva using four 65 kva resistance welding transformers at 440 primary input voltage. *Write*: Dix Engineering Co. Inc., Lincoln Park 25, Mich. *Phone*: Dunkirk 1-8822

Spot and Projection Weld

The roller head, press type combination welder is about 1 ft narrower than conventional machines. Reason: Arms are offcenter, with

ACTIVATED CLEANING breaks phosphatizing bottleneck

Hey, Joe, these door panels need two coats of paint. What's wrong?

Can't control the phosphate coating weight—crystals are too big. We'll hand rub the next few panels.

Hi, Jim, get me out of this jam. We need a uniform, lightweight zinc phosphate coating.

You're talking my language, Joe. Ever hear of Pennsalt activated cleaning and Fosbond?

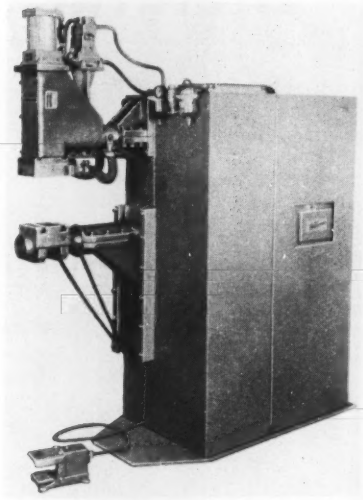
In your normal cycle, and with no hand rubbing, Pennsalt activated cleaning gives you a refined, lightweight Fosbond coating.

"But how does Pennsalt know so much about phosphate coating? It's a pretty new field."

"We called on our wide knowledge of all phases of metal surface preparation—cleaning, surface-activation, and phosphatizing . . . Don't forget, nobody knows more about metal-processing chemistry than Pennsalt."

A MONT LATE

NEW PRODUCTS and equipment



controls installed next to them and within the chassis frame.

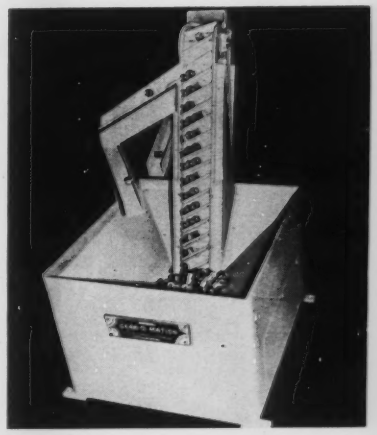
Arms can be installed left or right of center. The big advantage here is that a machine with right-hand mounted arms can be installed adjacent to one with left-hand mounted arms to bring the points within 9½-in. for sequence welding operations.

Welders are available in 30, 50 and 75 kva with 1000 psi at 80 lb line pressure and 75, 100 and 150 kva with 2300 psi at 80 lb line pressure. *Write*: Allied Welder Corp., 8700 Brandt, Dearborn, Mich. *Phone*: Luzon 4-4770

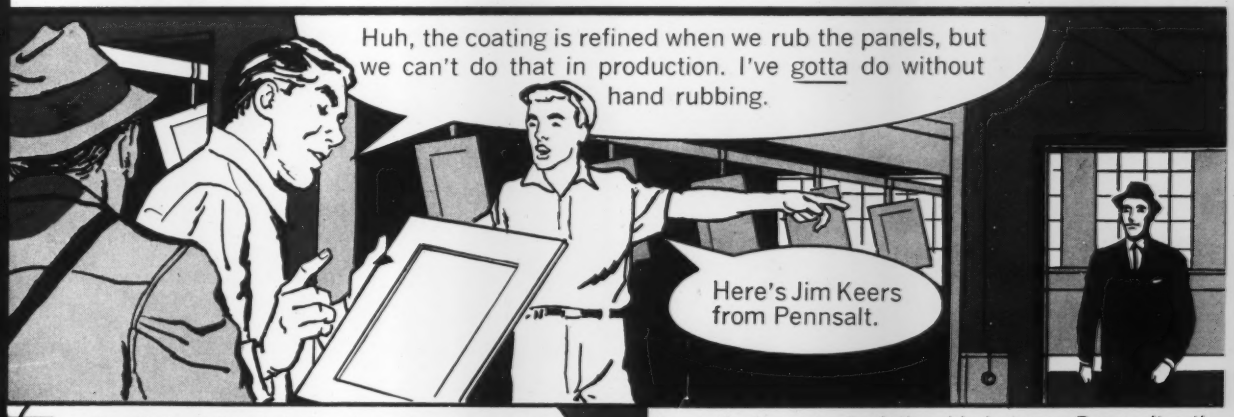
Combination Feeding Unit

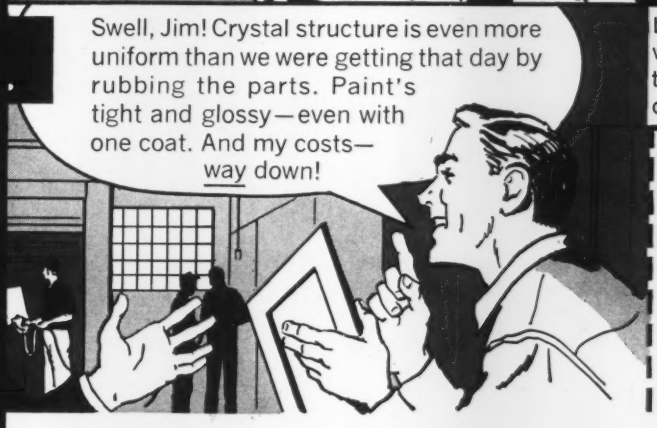
Here is a machine for the automatic elevating, orienting and feeding of parts to automated production lines. The combination unit handles parts that roll or slide, such as gears, cylinders and spiders. Although the equipment is tailored to a specific job, it is assembled from standard parts and can be adapted to any part feeding job.

From the hopper section of the unit, parts are scooped onto slanted shelves for elevating and feeding into a distribution system. When elevated, properly positioned parts roll through; improperly positioned ones are chuted again to the hopper as they fall free on the back side.



Before passing into the main distribution system, parts from the elevator are again checked for orientation by passing over a narrowed track. If not in line, they drop off and return to the hopper. *Write*: Gear-O-Mation Division, Michigan Tool Co., 7173 E. McNichols Rd., Detroit 12, Mich. *Phone*: Twinbrook 1-3111


Huh, the coating is refined when we rub the panels, but we can't do that in production. I've gotta do without hand rubbing.
Here's Jim Keers from Pennsalt.


Swell, Jim! Crystal structure is even more uniform than we were getting that day by rubbing the parts. Paint's tight and glossy—even with one coat. And my costs—way down!

Learn the important relationship between Pennsalt activated cleaning and effective phosphate coating. Send the coupon for information on Fosbond® phosphate coatings..."A BETTER START FOR YOUR FINISH."

Metal Processing Dept. 489
Pennsalt Chemicals
3 Penn Center, Philadelphia 2, Pa.

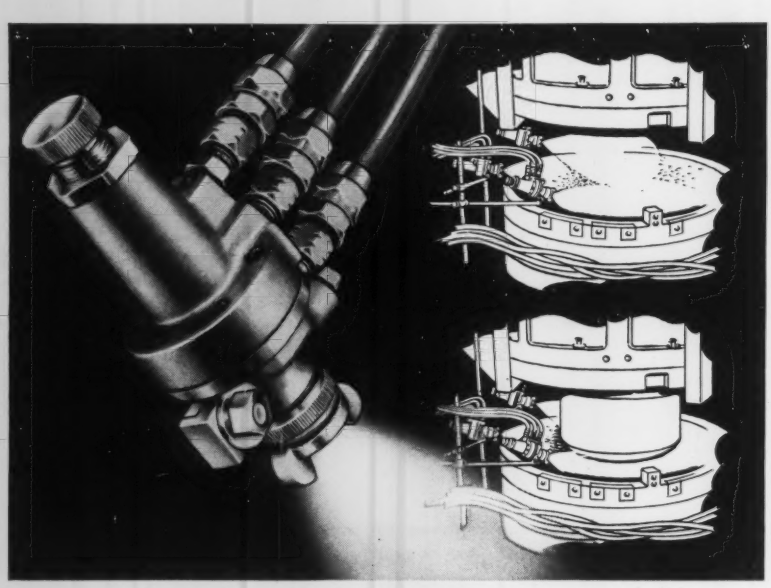
Pennsalt Chemicals

Send information on Pennsalt ☐ phosphate coatings ☐ metal cleaners ☐ cold-working lubricants

Name_____ Title_____
Company_____
Address_____
City_____ Zone_____ State_____

Automatically sprayed-on drawing compounds cut metal-forming costs

NEW DEVILBISS METHOD SAVES COMPOUND, COATS EVERY PART EXACTLY ALIKE, IS FULLY AUTOMATIC



Split-second timing. *DeVilbiss WDB automatic guns spray exact amounts of drawing compound evenly over specific areas of die, as it opens and closes. To synchronize spray with press cycle, cam-actuated air valve is worked off the ram. In other instances, a solenoid air valve is actuated by chain-drive timer, operating off gear wheel.*

Now you can cut stamping costs, increase production rates, get uniform application of drawing compound in your production of stamped or formed metals. DeVilbiss spray method and versatile spray guns eliminate wasteful swabbing, rolling, or dripping lubricants – save you time and money!

DeVilbiss WDB Gun is designed and built specially for applying die lubricants. It is compact, durable; sprays all types of compounds – from the lightest oil to the thickest creamy or foamed materials. Spray pattern is completely adjustable, from a fine round shape for narrow stock, to a broad fan for wide surfaces. The gun is built to maintain precise, constant rate of application; is easy to install, and offers low maintenance.

For full details, see your nearest supplier today; or write us direct. *The DeVilbiss Company, Toledo 1, Ohio.*

FOR BETTER SERVICE, BUY

DEVILBISS

DEVILBISS HELPS YOU GET THE MOST FROM THE SPRAY METHOD

NEW Literature

Write directly to the company for a copy

Automatic Stamping Presses

Catalog 57-2, 12 pages, gives engineering drawings and specifications on a line of two point, back gear underdrive presses of 75 to 200 tons capacity. Alpha Press & Machine Inc., 9281 Freeland Ave., Detroit 28, Mich.

Carbide Gages, Threading Tools

Bulletin CT-56, 8 pages, gives specifications on plain cylindrical and thread plug carbide gages, carbide taps and thread milling cutters. Detroit Tap & Tool Co., 8615 E. Eight Mile Rd., Baseline, Mich.

Car Unloading System

An improved pneumatic conveying system rapidly unloads cars of dry pulverized and granular materials—bulletin 174, 4 pages. Sprout, Waldron & Co., Muncy, Pa.

Contour Mill

Bulletin CRH-57 gives specifications and shows application photos of a hand-guided tracer machine—4 pages. Colonial-Romulus Division, Colonial Broach & Machine Co., Parkgrove Station, Detroit 5, Mich.

Worm Gear Speed Reducers

Bulletin CD-218, 24 pages, gives selection data on a complete line of double-enveloping worm gear speed reducers. Cone-Drive Gears Division, Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.

Deep Drawn Eyelet Parts

A booklet describes quality considerations inherent in the manufacture of items such as eyelets, shells, cups and ferrules. Sylvania Electric Products Inc., Warren, Pa.

Abrasive Shot and Grit

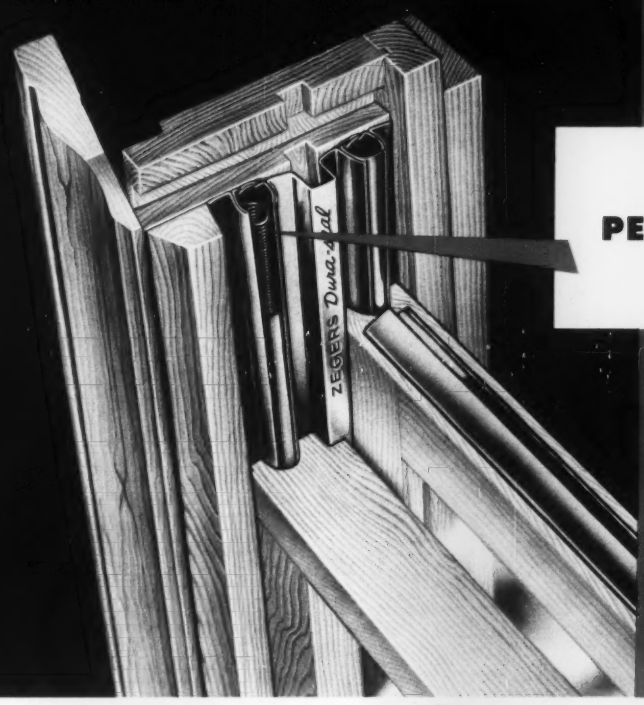
A 12-page catalog covers SAE specifications and shows methods and proper mixtures for shot peening and impact cleaning. Abrasive Shot & Grit Co., Springville, N. Y.

Leaded Alloy Steel

Engineering data bulletin 14-5 includes case histories and properties of a chromium-molybdenum 0.40 carbon steel (Rycut 40)—8 pages. Joseph T. Ryerson & Son Inc., Box 8000-A, Chicago 80, Ill.

Hydraulic Pallet Truck

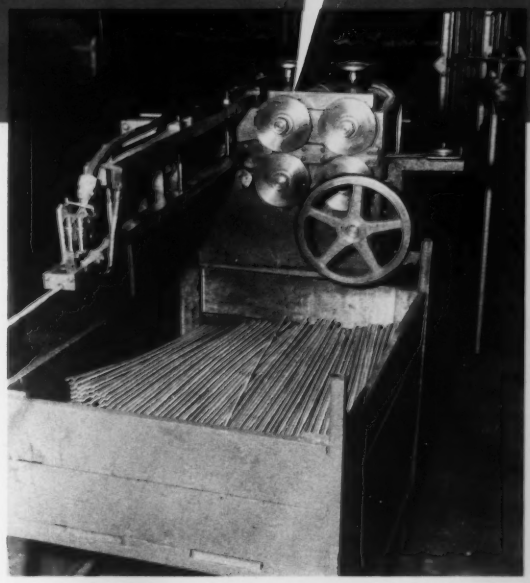
Bulletin 226 illustrates recent improvements made on a 1-ton capacity hand truck—2 pages. Raymond Corp., 91-150 Madison Ave., Greene, N. Y.



GOOD PERFORMANCE HERE

KEYSTONE GALVANIZED MB SPRING WIRE STUDY

BEGINS HERE



Hour after hour, quality springs pop out of this spring machine. The uniformity of Keystone's drawn Galvanized MB Spring Wire assures long, trouble-free runs.

...that's why Zegers, Inc. specify KEYSTONE GALVANIZED SPRING WIRE

The above illustration shows a double hung window equipped with Dura-Seal combination metal weatherstrip and spring sash balance manufactured by Zegers, Inc., Chicago, Ill. Heart of the successful operation of this quality product is its spring balance. Not only must it have exactly the right tension for easy window operation, but must withstand countless flexings over a long period of time. Equally important, it must be easy and economical to produce.

Keystone Galvanized MB Spring Wire is preferred at Zegers for these reasons: Keystone has more consistent uniformity of composition, tensile and diameter—hence less trouble in their spring machines. That's because Keystone's unique method of cold drawing after galvanizing produces a dense, smooth coating free from flaking.

If you use wire to make your products, it will pay you to talk over your needs with your Keystone representative. For more information, send us the coupon below. Tell us how we can serve you.

Keystone Steel & Wire Company, Peoria 7, Illinois

KEYSTONE
WIRE FOR INDUSTRY

Keystone Steel & Wire Company
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Brand New . . . COLD HEADING FACTS FOLDER . . . send coupon today! New folder discusses uses, applications, methods, technical facts, wire requirements.

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Now you can get from PROGRESSIVE Slotted Tapping Screws with an extra customized touch — Slotted Tapping Screws which are custom-made to your order. This means: (1) specifically made for you — not bin stock parts; (2) fast, custom-handling of every order; *plus* (3) the double economy of low initial cost *and* the savings in your assembly operations possible only with high precision, torsion-tested fasteners.

STANDARDS AND SPECIALS CUSTOMIZED FOR YOUR NEEDS

THE PROGRESSIVE MFG. CO.

Division of The Torrington Company

76 Norwood Street, Torrington, Connecticut

Market Outlook

PROTECTIVE covering of steel requirements against an anticipated price increase at mid-year hasn't built up much pressure in the markets. Demand continues at the pace that has prevailed for the last couple months.

But the belief persists that substantial hedge buying will be done by consumers, especially the larger interests, over the next few weeks. It should result in a noticeable bulge in June specifications.

SUPPLIES COMFORTABLE— Except for heavy plates and structurals, finished steel products are in relatively easy supply. Sheets, strip, bars, wire products and commercial pipe are readily available for shipment before the end of the current quarter. Even seamless pipe is more plentiful.

Third quarter orders are coming to the mills at a much slower pace than had been expected. Only plate, structural and tin plate schedules appear to be filled through July. Indications are there won't be much new buying (except for a little protective covering) before late third quarter. By that time, auto builders will be actively seeking tonnage for 1958 models.

LESS STRINGENT—General loosening in the light plate market continues. More improvement is seen in plates ½-in. and under as strip mills contribute increasing tonnage in that size range—offsetting the slack demand for hot and cold-rolled sheets.

The structural steel situation also is improved. In part this is due to expanded production of lighter shapes on mills which normally concentrate on the larger sizes. Shape deliveries are noticeably better.

HIGHER PRICES— It is generally believed that steel prices will rise at midyear to offset increases in wages and fringe benefits scheduled to become effective July 1.

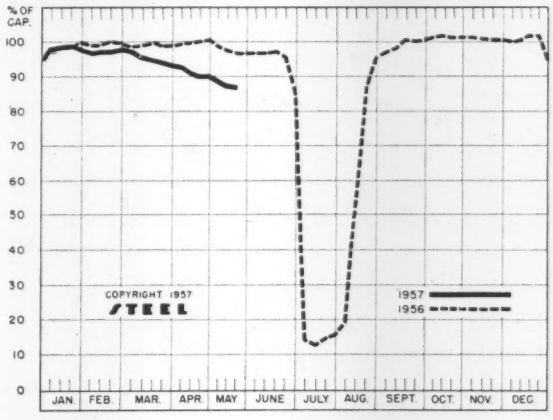
Just how much prices will rise is anybody's guess. Some steelmakers estimate their costs will be hiked at least 20 cents an hour by the wage boost. This, they say, should mean a price increase of at least $8 a ton. A question to keep in mind: Will the pace of demand influence the extent of increases?

SCRAP RISING— The price composite on the prime steelmaking grades of scrap advanced another 67 cents a ton and now stands at $45. This is the highest level the index has attained since early April. The rise of the last couple weeks reflects returning strength in a market that has been on the downside since last December.

PRODUCTION— The national steel ingot rate continues to slip. Last week it eased off another ½-point to 86.5 per cent of capacity. Expectations are it will go lower over the coming weeks, probably hitting the bottom of the decline in July. At that time, mass vacations are usually accompanied by temporary suspensions.

The nation's steelmaking furnaces produced 9,814,000 net tons in April, bringing output for the first four months of the year to 41,399,042 net tons. That's about 1 million tons below the figure for the same period last year. April ingot operations averaged 89.5 per cent. The average for the first four months was 94.4 per cent.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended May 19	Change	Same Week 1956	Same Week 1955
Pittsburgh	92	— 0.5*	100	99
Chicago	86	— 2*	100.5	98
Mid-Atlantic	95	— 0.5	98.5	96
Youngstown	81	— 3	101	98
Wheeling	85.5	+ 4	97	95.5
Cleveland	87	+ 0.5*	95.5	98.5
Buffalo	85.5	— 7	105	104.5
Birmingham	93.5	— 2	23.5	93.5
New England	54	— 2	87	88
Cincinnati	78.5	+ 9.5	94.5	91
St. Louis	85.5	+ 1.5	93.5	106
Detroit	82.5	0	98	90
Western	99	0	109	103
National Rate	86.5	— 0.5	96.5	96.5

INGOT PRODUCTION‡

	Week Ended May 19	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	140.1†	138.2	144	146
NET TONS (In thousands)	2,251†	2,220	2,313	2,345

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,559,490 in 1957; 2,461,893 in 1956; 2,413,278 in 1955.

Metalworking Outlook—p. 89 Technical Outlook—p. 137

OVER-DESIGNING?

If you are designing bronze parts for mass production, there is a good chance that you are specifying a more costly alloy than you need.

ASARCO's patented continuous-casting process produces alloys according to SAE, ASTM and Government specifications. But their performance is entirely unlike that of similar alloys cast in sand or permanent molds. Relatively low-cost alloys cast by the ASARCO process perform like more expensive alloys cast by other methods.

For example, compare Continuous-Cast SAE 660 (ASARCON 773) with more expensive sand-cast alloys:

	Typical Yield Strength	Typical Impact Strength	Brinell Hardness
ASARCON 773	27,000 psi	12.5 ft.-lbs.	72
Sand-Cast SAE 62	20,000 psi	8.7 ft.-lbs.	65
Sand-Cast SAE 64	17,000 psi	8.2 ft.-lbs.	62

Unless you've checked to see whether the unique ASARCO bronzes can give you what you need, there's a possibility that you're over-designing. You may even be able to replace aluminum and manganese bronzes with low-cost ASARCON Continuous-Cast bronzes under certain conditions. Over-designing can be expensive in mass production, even if you are spending only a penny or two extra per pound of bronze.

ASARCON 773 (SAE 660) is readily available from stock in a wide range of sizes. An added bonus is the fact that ASARCON 773 is exceptionally free-machining. Rods, tubes, and numerous "extruded" shapes up to 9 inches in diameter are cast to order by ASARCO in more than 20 alloys.

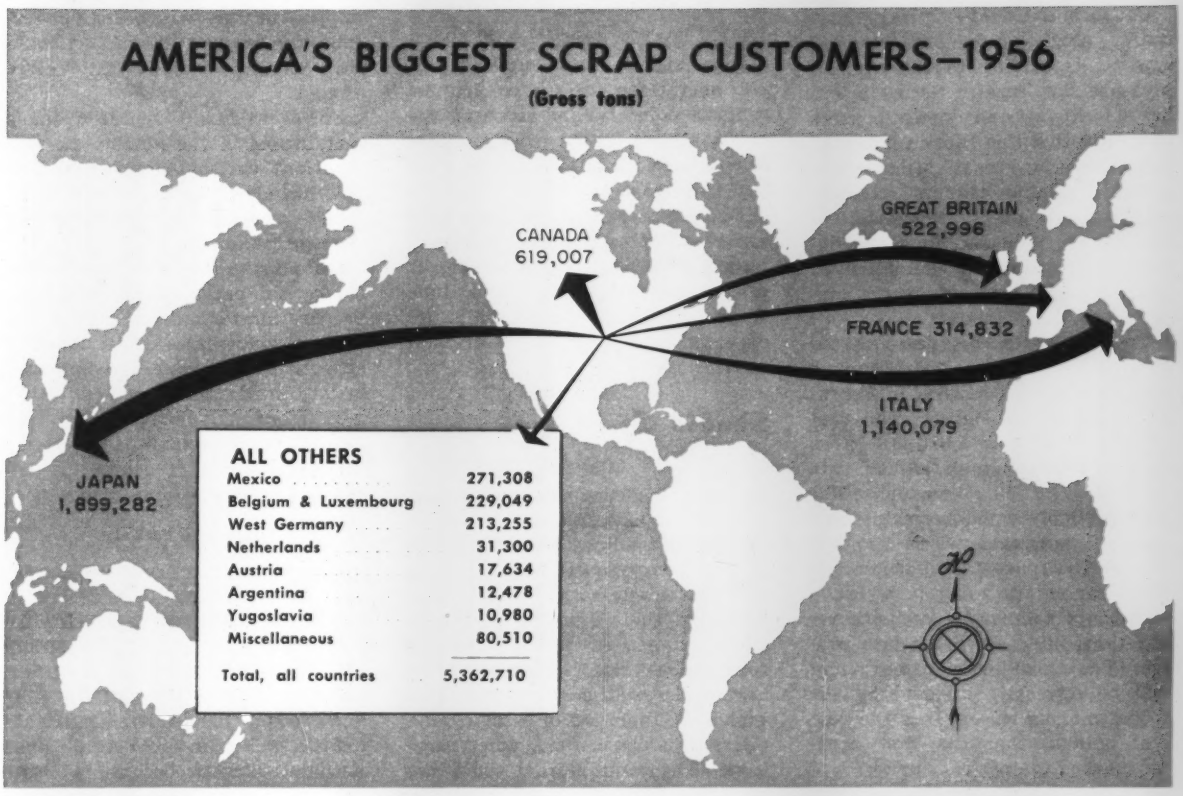
We'll be happy to send you a free booklet describing the process and the product.

Continuous-Cast Products Department

AMERICAN SMELTING AND REFINING COMPANY

Perth Amboy Plant, Barber, New Jersey • Whiting, Indiana

WEST COAST SALES AGENT: Kingwell Bros. Ltd., 457 Minna Street, San Francisco IN CANADA: Federated Metals Canada, Ltd., Toronto and Montreal



Source: Department of Commerce

Scrap Exports To Level Off

Commerce department still fears long term supply problem as foreign shipments increase. Japan's appetite for No. 1 heavy melting prompts tougher licensing policy

IRON AND STEEL scrap exports this year should wind up about where they did in 1956 despite a fast start in the first four months. Reason: Government limitations on shipments of heavy melting steel.

Early this year, the Department of Commerce advised Japan, Great Britain and the European Coal & Steel Community that licenses for export of heavy melting scrap will not be issued in excess of the tonnages shipped in 1956. (See illustration above.) Great Britain and ECSC accepted the policy and paced their applications accordingly, but Japan kept pushing ahead. By the end of April, the Japanese had purchased almost as much No. 1 heavy melting (about 584,500 gross tons) as they had in all of 1956. This prompted Commerce to issue an interim ruling putting more teeth in its policy. Although applying to all three groups, it was aimed primarily at Japan.

Compromise — Discussions are continuing, and while pending applications for export to Japan are being returned by the department without action, they are not being rejected. Presumably, some compromise will be reached which will permit Japan to take more scrap, though on a drastically reduced basis. The interim policy will remain in effect until the discussions are concluded.

The department is influenced by a report it submitted to Congress last January. Based on Battelle Memorial Institute findings, it called attention to "the serious long term supply problem that faces the U.S. economy because of impending shortages of heavy melting scrap."

Double Barrel—The new ruling also affects No. 2 heavy melting, whether it is located in continental U.S. or in offshore areas. The two grades account for over 60 per cent of all the iron and steel scrap exported.

Should this year's total no more than equal the 5,362,710 gross tons shipped abroad last year many domestic buyers will feel that it is still too much. The uptrend in exports over the last several years has been pronounced. In 1950, they were 194,114 gross tons; in 1951, 196,955; in 1952, 304,086; in 1953, 271,179; in 1954, 1,345,786;

and in 1955, 4,537,372 gross tons.

Cause and Effect—During these years, steel production reached new peaks, adding to the over-all pressure for scrap. Scrap prices hit new highs, and domestic users naturally tied this fact in with the mounting movement of material abroad. Many traders contend that exports largely represent excess scrap, collected in many instances from points well removed from areas of heavy domestic consumption.

Scrap exports this year started off at a terrific pace: 451,334 gross tons in January; 542,647 in February; 676,432 in March. The first quarter total was 1,670,413 gross tons, representing an annual rate of over 6,680,000 gross tons. The pace probably won't be maintained for the year as a whole. And it is equally apparent that shipments this quarter are going to be down because of temporary licensing restrictions imposed in the late winter. The third quarter movement will be adversely affected by the recent interim ruling. It is the general opinion that the first quarter marked the peak.

Wire . . .

Wire Prices, Pages 247 & 248

It is estimated that wire mill ingot operations are 15 to 20 percentage points under those of the steel industry as a whole. This mirrors slackening demand for rods and finished wire.

Deliveries on most wire products are ahead of normal lead time, and buying in anticipation of a midyear price increase is light. Still, June shipments from the wire mills are expected to be slightly better than those in April and May.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 246 & 247

Sheet business in general is drifting. Consumption in some metalworking lines is off 10 to 15 points from earlier peaks.

A few scattered customers have increased their June orders in an effort to get extra tonnages before prices rise. Several others have cut stocks so low they must replenish them before their suppliers slow down for summer vacations. The result is that some tonnage scheduled originally to be shipped in July will be shipped in June. No major gains in shipments are expected, however, before August.

Sheet producers report a sharp curtailment in the number of cancellations and cutbacks of orders. They believe this indicates that customers have completed their inventory corrections.

Auto makers will be out of the market in early third quarter in preparation for model changes, but at least one major sheet supplier expects a "scramble for tonnage" in late third quarter.

Sales of galvanized sheets continue disappointing.

Steel Bars . . .

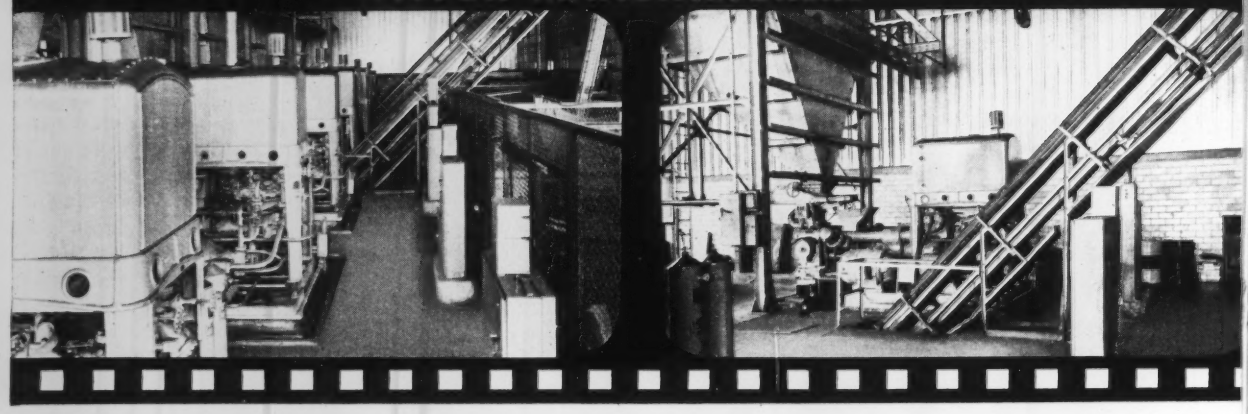
Bar Prices, Page 245

One Pittsburgh producer of cold-finished bars says that nearly 70 per cent of his orders are for delivery within one week. Few orders for June delivery have been received.

Merchant bar sellers anticipate a little pickup in ordering on June account, largely because of pro-

MILWAUKEE PRESSES convert machine shop scrap

...FOR MANUFACTURERS



OVER 35,000 TONS OF SCRAP . . . VALUED AT MORE THAN $600,000 . . . RECLAIMED ANNUALLY AT FORD'S CLEVELAND ENGINE PLANTS

A battery of six MILWAUKEE Briquetting Presses effects substantial savings at Ford Motor Company's integrated engine plants and foundry in Cleveland, Ohio. Automatic in operation, these hydraulic presses convert bulk cast iron chips from the two engine plants into dense briquettes that are re-charged into the foundry cupolas.

This effective recovery and processing system assures maximum reclamation of valuable scrap . . . reduces dependence on outside sources. In addition, briquettes are easier to handle and require minimum storage space per ton.

7144-SI

tective covering against higher prices expected to become effective in July. Fabrication of bars into finished goods has not shown much increase of late.

Currently, most mills have tonnages available for shipment in June. Only in large flats does there appear to be any sign of supply stringency.

In general, demand is described as spotty. This is particularly the case with hot and cold-drawn carbon bars, and to some extent alloys, though the latter are moving slower than either the hot or cold-drawn carbon grades.

U.S. Steel Corp.'s Fairless Works closed down its bar mill May 19 for two weeks for maintenance repairs and mass vacations.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 245

Sustained high production of reinforcing bars is meeting active demand in the East, with bridge tonnage heavier in New England. Requirements for schools also are active. Some 500 tons of mat reinforcement are up for bids in Connecticut. Other work pends in the area.

Although higher prices for deformed bars are maintained, competitive factors (price and delivery) have not entirely disappeared. The low estimate for bridges is frequently 15.00c a pound for bars in place. Concrete bar prices for schools and like structures have increased an estimated 15 per cent over the last 18 months—substantially less than fabricated structural steel and joists.

Northeastern Steel Corp., Bridgeport, Conn., is rolling reinforcing bars and selling direct.

In general, demand for reinforcing bars over the country is substantial. Considerable work that ordinarily would go structural steel is developing. Highway work figures prominently everywhere. So do school construction and other public jobs.

Tubular Goods . . .

Tubular Goods Prices, Page 249

Reflecting the decrease in the price of zinc a week ago, U.S. Steel Export Co. announced revised export prices on galvanized plain wire and galvanized buttweld and seamless pipe.

Merchant pipe sales are gaining slowly. Construction requirements are slightly higher for June. In other tubular products, a Pittsburgh buyer says line pipe producers have filled order books as far ahead as fourth quarter, 1961.

Oil country tube orders are being received in good volume for third quarter. Poor weather in the Southwest reportedly affected oil well drilling this month and last, but orders are now increasing for drill pipe and casing.

Plates . . .

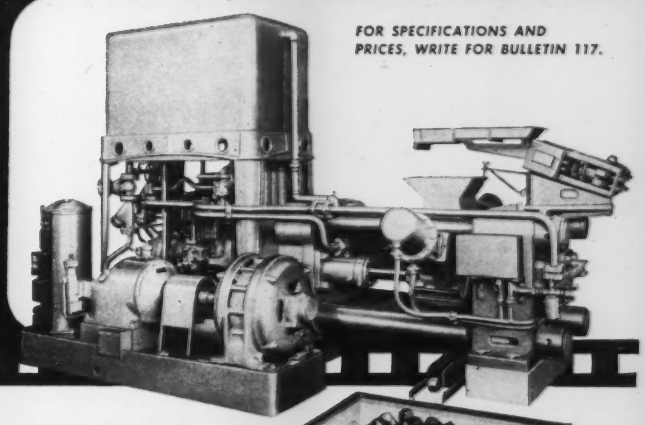
Plate Prices, Page 245

Plate demands of eastern shipyards are particularly active. It is reported that considerable conversion plate is being purchased at premium prices to fill pressing needs of line pipe fabricators. In this connection, considerable slab tonnage for plate conversion is available from the sheet mills, currently in something of a slump.

Most platemakers are not increasing their initial third quarter

into savings and extra profits . . . *automatically!*

. . . FOR SCRAP PROCESSORS



FOR SPECIFICATIONS AND PRICES, WRITE FOR BULLETIN 117.

BRIQUETTED CHIPS AND TURNING HAVE INCREASED PROFIT MARGIN OF 30% OR MORE PER TON

Classified as high-grade scrap, briquettes mean extra income. The increased value, depending upon type of scrap converted, ranges up to *$20.00 or more per ton.*

Scrap processors are using MILWAUKEE presses to expand operations at surprisingly low cost. Many amortize the initial investment within the first year.

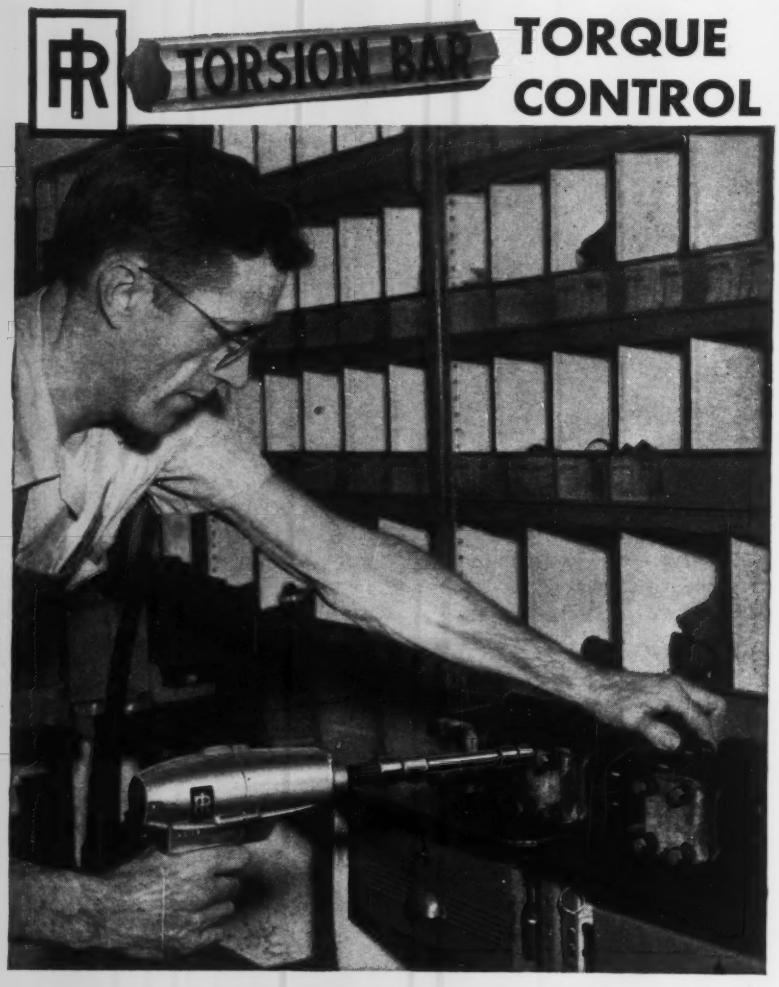
Four press models are available . . . capacities range up to 3½ tons per hour.

WORLD'S LARGEST SUPPLIERS SPO OF MOLDING MACHINES

SPO INCORPORATED

Milwaukee Division

6494 Grand Division Avenue • Cleveland 25, Ohio



TORQUE CONTROL IMPACTOOLS meet torque specifications 100%

Quality Control Improved on 12 Jobs in 3 Departments

1. **Cable control assemblies:** 5 operations involving torques from 14 to 75 ft. lbs.
2. **Scraper Assembly:** 6 line jobs using Impactools set for 40, 60, 75 and 80 ft. lbs. torques.
3. **Hydraulic control assembly:** 1 job running ½" cap screws to 65 ft. lbs. torque.

Production checks made by this manufacturer of road building equipment show that new Ingersoll-Rand Torsion-Bar Torque Control Impactools run every nut and cap screw within torque specifications.

With the standard impact wrenches previously used, the operators attempted to control torque by length of time the tool impacted. The new Torque Control Impactools shut off instantly and automatically when the pre-set torque is reached. This simplifies operator training and improves worker morale.

The end result is dependable product performance in the field. This same kind of cost-saving performance can be put to work for your company now. Write for Bulletin 5170.

Ingersoll-Rand

11 Broadway, New York 4, N.Y.

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allotments of heavier gage and wider plates.

Tank shop backlogs are fairly large and improved supplies of light gage plates are permitting them to up production schedules.

The Claymont Department of Wickwire Spencer Steel at Claymont, Del., will suspend operations on the larger of its two plate mills, 160-in., late in June for installation of new mill housings.

Vacation schedules also will cut into plate production around that time. Alan Wood Steel Co., Conshohocken, Pa., will suspend rolling operations in the first week of July for mass vacations.

Structural Shapes . . .

Structural Shape Prices, Page 245

Structural steel inquiry is a little better than it was a month ago. But fabricating shops are still turning out more tonnage than they are booking. Shops are competing actively for new jobs, particularly in the New York, Philadelphia and New England markets, but fabricators elsewhere are actively seeking new orders as their backlogs tend to shrink.

Bridge work continues outstanding in the New York area, current awards being featured by the placing of 13,500 tons for the Brooklyn-Queens expressway. This job went to the American Bridge Division, U.S. Steel Corp., Pittsburgh. Considerable miscellaneous work is pending in the area.

In the Midwest, a substantial volume of work is on fabricators' books. But they are actively seeking new orders with steel in slightly easier supply.

The California senate has approved legislation authorizing a $35 million remodeling program for the San Francisco-Oakland Bay bridge.

Warehouse . . .

Warehouse Prices, Page 250

Some distributors estimate business in May will be off about 10 per cent from April. Only in plates, particularly the heavier gages, and heavy shapes is demand sustained.

A few warehouses report an increase in orders for sheets and bars. Demand for merchant pipe is increasing.

In most districts prices are steady with the exception of down-

ward revisions in galvanized sheets. In Houston, however, one major distributor made price reductions averaging 90 cents to $1 on hot-rolled bars, strip and structurals. Announced reason: Adoption of a new pricing system. Real reason: Local market and competitive factors. Some foreign steel has been arriving in the area to add to domestic competition.

Some price shaving of the faster moving items is reported in that district. The major warehouse has been setting prices by using a markup on the base mill price and adding the usual extra. Now it's basing its markup on the net price of the base mill and extra price combined.

Watch for similar downward price adjustments in the Portland, Oreg., area for the same reasons.

Iron Ore . . .

Iron Ore Prices, Page 251

Shipments of Lake Superior iron ore in the week ended May 13 totaled 2,994,458 gross tons, reports the Lake Superior Iron Ore Association. This compares with 2,968,294 tons in the corresponding week of last year.

Cumulative shipments in the 1957 lake navigation season to May 13 were 8,893,614 tons, down 1,783,671 tons from the 10,677,285 tons moved to May 13 last year.

Total receipts of iron ore from all sources in the first quarter this year were 10,698,696 gross tons, reports the Lake Superior Iron Ore Association. This compares with 11,054,371 in the like period, 1956.

Of the total tonnage, 881,327 tons were U.S. Lake Superior ores; 5,065,033 tons, other U.S. ores; 152,122 tons, Canadian Lake Superior; 137,707, other Canadian; 4,462,507, foreign ores (other than Canada).

Stocks of ore on the last day of the first quarter amounted to 32,479,684 tons. This compares with 30,057,448 tons on the last day of the first quarter, 1956. Stocks broke down this way: U.S. Lake Superior, 20,908,474 tons; other U.S. ores, 3,364,353; Canadian Lake Superior, 1,032,741; other Canadian, 3,098,777; foreign ores (Canada excepted), 4,075,339 tons.

During the first quarter, consumption totaled 34,833,076 tons,

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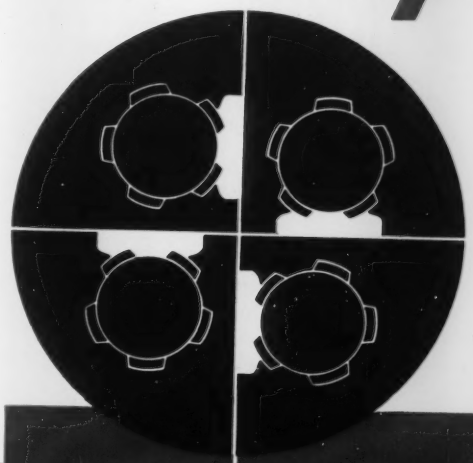

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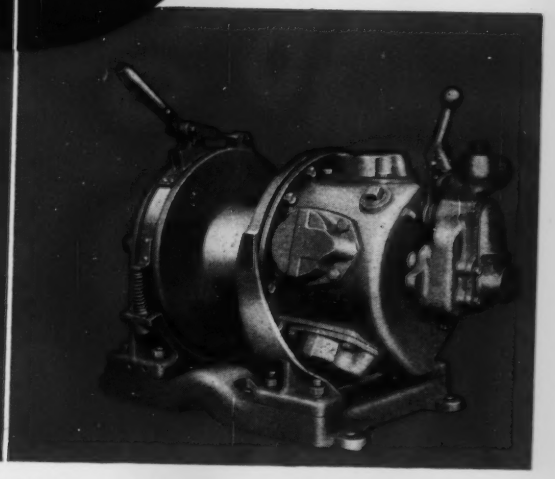

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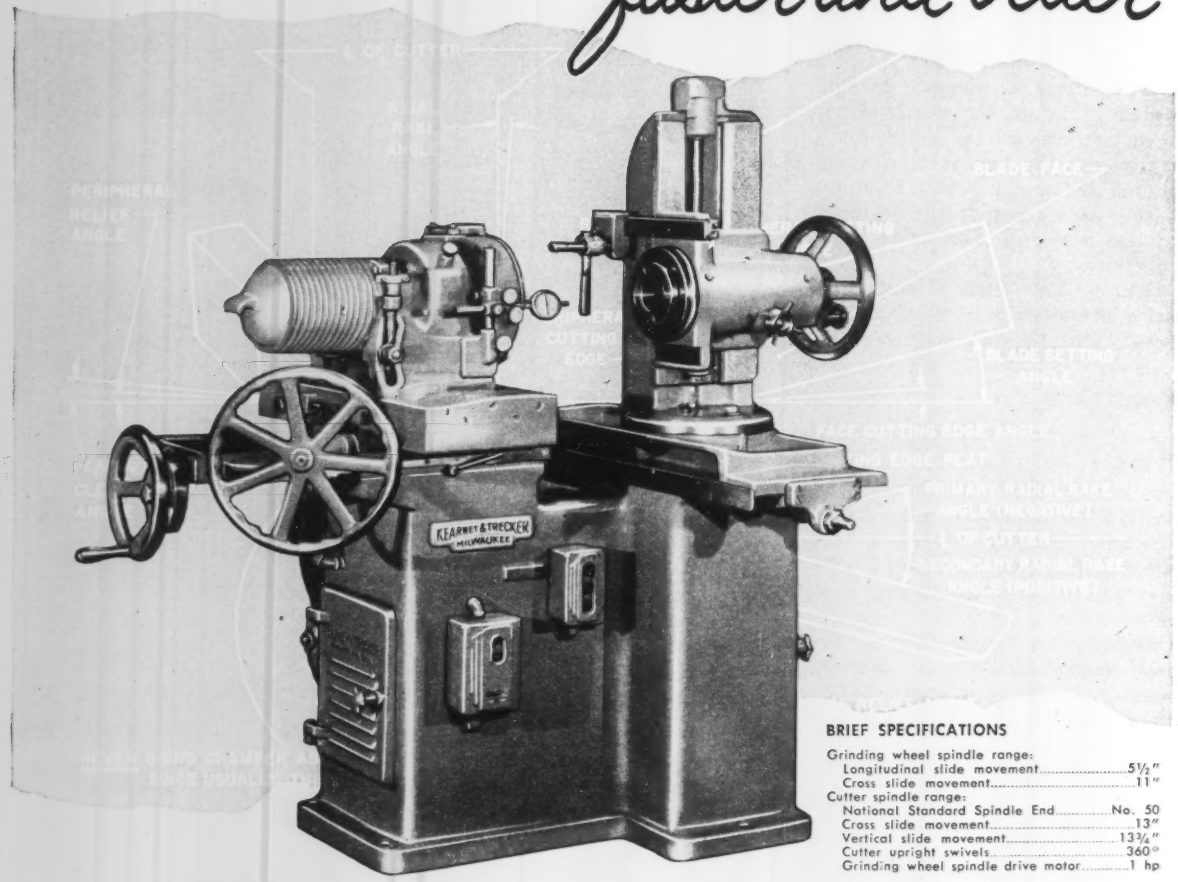

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compared with 34,472,410 in the like period a pear ago. Consumption broke down this way: U.S. Lake Superior, 21,473,027 tons; other U.S. ores, 4,739,086; Canadian Lake Superior, 1,120,029; other Canadian, 2,391,305; foreign (except Canada), 5,109,629 tons.

Steel Output Slips Slightly

Steel ingot production totaled 9,814,000 net tons in April, reports the American Iron & Steel Institute. This brought total output for the first four months of this year to 41,399,042 tons, about 1 million below the figure for the comparable period of last year (42,395,799 tons).

April output compared with 10,589,074 tons in March and 10,523,785 tons in April, 1956.

The index of raw steel production (based on average output of the three years 1947-48-49 as 100) was 142.6 during April, against 148.8 for March and 152.9 during April last year. The average for the first four months of this year was 150.3.

During April, steelmaking furnaces were operated at an average of 89.5 per cent of the Jan. 1, 1957, capacity (133,459,150 net tons annually). In March, the average was 93.4 per cent. The average for the first four months was 94.4 per cent.

March Steel Shipments Heavy

Record shipments in several categories of finished steel products were reported in March, says the American Iron & Steel Institute. Total tonage moved was 7,821,616 net tons, the highest monthly total this year. Only three months last year (March, June and October) were better. In February, shipments amounted to 7,066,732 net tons; in March, 1956, they were 8,255,824 tons.

Construction (including maintenance) received 1,120,545 net tons in March, a record. The prior top figure was 1,061,300 tons in October, 1956. Shipments of heavy structural shapes totaled 614,277 tons in the month, compared with the former monthly high of 553,255 tons in October of last year.

Electrolytic tin plate shipments topped any month on record at 618,827 net tons, compared with the former high of 598,129 in March, 1956. Largely because of that record, total shipments of all tin mill products also reached a new high of 809,186 tons.

Shipments of line pipe (370,490 tons) and of oil country goods (285,642 tons) set records during March. Plate shipments set a postwar record at 881,498 tons.

Categories, in addition to construction, which received record shipments during March included

Steel Ingot Production—April 1957

	—OPEN HEARTH—		——BESSEMER——		——ELECTRIC——		——TOTAL——	
Period	Net tons	Per cent of capacity	Net tons	Per cent of capacity	Net tons	Per cent of capacity	Net tons	Per cent of capacity
1957								
January ..	9,829,691	99.0	294,839	77.1	884,232	86.5	11,008,762	97.1
February .	8,898,671	99.2	277,682	80.4	810,853	87.8	9,987,206	97.6
*March ..	9,442,164	95.1	275,156	71.9	871,754	85.2	10,589,074	93.4
*1st Qrt. .	28,170,526	97.7	847,677	76.3	2,566,839	86.4	31,585,042	96.0
†April	8,821,000	91.8	232,000	62.7	761,000	76.9	9,814,000	89.5
1956								
January ..	9,676,151	101.4	323,235	79.5	828,845	86.7	10,828,231	99.3
February .	9,043,064	101.3	296,543	78.0	799,388	87.1	10,118,995	99.2
March	9,795,263	102.7	310,060	76.3	819,465	85.7	10,924,788	100.2
1st Qtr. ..	28,514,478	101.8	929,838	77.9	2,427,698	86.5	31,872,014	99.6
April	9,437,945	102.2	306,388	77.9	779,452	84.2	10,523,785	99.7
May	9,370,167	98.2	297,990	73.3	822,219	86.0	10,490,376	96.2
June	8,665,044	93.9	282,846	71.9	773,546	83.6	9,721,436	92.1
2nd Qtr. ..	27,473,156	98.1	887,224	74.3	2,375,217	84.6	30,735,597	96.0
1st 6 Mo. .	55,987,634	100.0	1,817,062	76.1	4,802,915	85.6	62,607,611	97.8
July	1,330,151	13.9	.....	....	292,012	30.5	1,622,163	14.9
August	7,213,274	75.6	189,564	46.6	719,759	75.3	8,122,597	74.5
September..	9,342,796	101.2	286,978	72.9	792,885	85.7	10,422,659	98.8
3rd Qtr. ..	17,886,221	63.2	476,542	39.5	1,804,656	63.6	20,167,419	62.3
9 Mo.	73,873,416	87.6	2,293,604	63.8	6,607,571	78.2	82,774,591	85.9
October ...	9,841,002	103.2	330,101	81.2	877,410	91.8	11,048,513	101.3
November .	9,430,248	102.2	295,827	75.2	829,425	89.6	10,555,500	100.0
December .	9,695,919	101.6	308,465	75.9	833,161	87.1	10,837,545	99.4
4th Qtr. .	28,967,169	102.3	934,393	77.4	2,539,996	89.5	32,441,558	100.3
2d 6 Mo..	46,853,390	82.8	1,410,935	58.5	4,344,652	76.5	52,608,977	81.3
Total 1956	102,840,585	91.6	3,227,997	67.4	9,147,567	81.2	115,216,149	89.8

Note—The percentages of capacity operated are calculated on annual capacities as of Jan. 1, 1956, as follows: Open hearth 112,317,040 net tons, bessemer 4,787,000 net tons, electric 11,259,050 net tons, total 128, 363,090 net tons.

Note—The percentages of capacity operated are calculated on annual capacities as of Jan. 1, 1957, as follows: Open hearth 116,912,410 net tons, bessemer 4,505,000 net tons, electric 12,041,740 net tons, total 133,459,150 net tons.

*Revised. †Preliminary figures subject to revision.

mill
drill
ream
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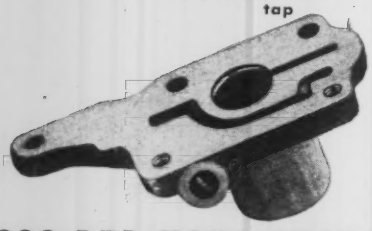

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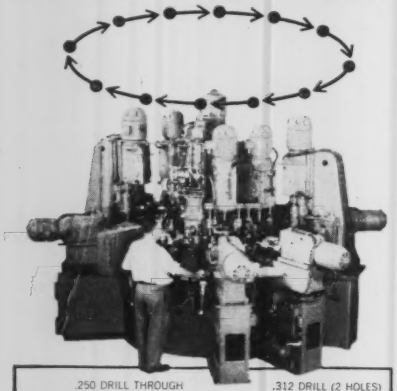

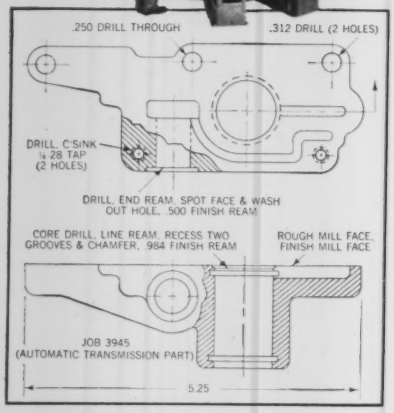

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warehouses for the oil and gas industries, 245,160 tons; cans and closures, 684,146 tons.

The leading consuming groups during March were: Warehouses, 1,456,677 tons; automotive, 1,219,968; construction, 1,120,545; containers, 809,752; machinery, industrial equipment and tools, 461,269 net tons.

Pig Iron . . .

Pig Iron Prices, Page 250

Merchant iron is moving slowly. Demand is off slightly from April which, in turn, was down from March. It appears the dip is leveling off.

Foundry activity is spotty. Automotive and farm implement requirements for castings are steady, but construction and general demand is softer. Most casters are buying iron on a hand-to-mouth basis. Trading is expected to show little material improvement before late summer; it probably will sink lower before turning upward. Early July likely will witness the most severe dip as many foundries shut down for mass vacations.

Reflecting the light demand for pig iron, some producers are banking furnaces. Youngstown Sheet & Tube Co. has banked its No. 3 and No. 5 blast furnaces at its South Chicago Works.

Republic Steel Corp. closed down its No. 1 blast furnace at Cleveland for repairs. It will be out of production until mid-June. It has rated annual capacity of 442,000 net tons.

On the West Coast, melters are operating close to 100 per cent of capacity, with some overtime reported.

RAILS, CARS . . .

RAILROAD CARS PLACED

Chesapeake & Ohio, 50 seventy-ton gondolas, to the Pullman-Standard Car Mfg. Co., Chicago.

Union Pacific, 500 seventy-ton gondolas, to the ACF Industries Inc., New York, and 100 seventy-ton covered hoppers to the Pullman-Standard Car Mfg. Co., Chicago.

Canadian National, 500 freight cars placed; 300 fifty-ton boxcars to the Pullman-Standard Car Mfg. Co., Chicago, 100 fifty-ton flatcars to the Magor Car Corp., New York, and 100 seventy-ton hoppers to the ACF Industries Inc., New York. The equipment is for the Grand Trunk Western.

Utah Railroad, 200 seventy-ton hoppers, to the Pullman-Standard Car Mfg. Co., Chicago.

Northern Pacific, 1000 fifty-ton boxcars, to its Brainerd, Minn., shops.

Chicago & Eastern Illinois, 50 gondola cars, to the Johnstown, Pa., shops of Bethlehem Steel Co., Bethlehem, Pa.

Union Tank Car Co., ten 10,000-gal tank cars, to own shops.

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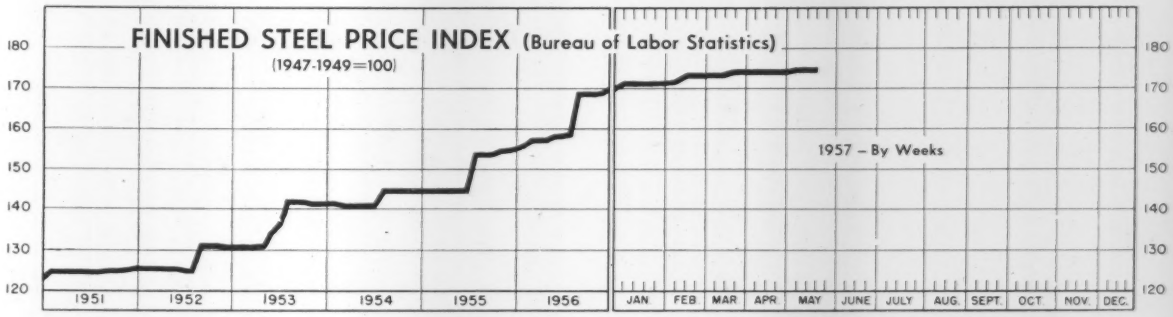
Price Indexes and Composites



May 14, 1957	Week Ago	Month Ago	April Avg.	Year Ago
174.4	174.4	174.0	174.0	158.1

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended May 14

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard, No. 1	$5.350	Bars, Reinforcing	5.788
Rails, Light, 40 lb	6.817	Bars, C.F., Carbon	9.910
Tie Plates	6.275	Bars, C.F., Alloy	13.425
Axles, Railway	9.400	Bars, C.F., Stainless, 302 (lb)	0.533
Wheels, Freight Car, 33 in. (per wheel)	57.50	Sheets, H.R., Carbon	5.945
Plates, Carbon	5.900	Sheets, C.R., Carbon	6.789
Structural Shapes	5.667	Sheets, Galvanized	8.070
Bars, Tool Steel, Carbon (lb)	0.480	Sheets, C.R., Stainless, 302 (lb)	0.660
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.585	Sheets, Electrical	11.225
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.274	Strip, C.R., Carbon	8.843
Bars, Tool Steel, H.R., Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.769	Strip, C.R., Stainless, 430 (lb)	0.475
Bars, H.R., Alloy	10.150	Strip, H.R., Carbon	6.000
Bars, H.R., Stainless, 303 (lb)	0.508	Pipe, Black, Buttweld (100 ft)	18.894
Bars, H.R., Carbon	6.075	Pipe, Galv., Buttweld (100 ft)	22.688
		Pipe, Line (100 ft)	190.108
		Casing, Oil Well, Carbon (100 ft)	185.566
		Casing, Oil Well, Alloy (100 ft)	288.980
		Tubes, Boiler (100 ft)	46.737
		Tubing, Mechanical, Carbon (100 ft)	23.713
		Tubing, Mechanical, Stainless, 304 (100 ft)	197.663
		Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	9.783
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.483
		Black Plate, Canmaking Quality (95 lb base box)	7.583
		Wire, Drawn, Carbon	9.775
		Wire, Drawn, Stainless, 430 (lb)	0.630
		Bale Ties (bundle)	7.400
		Nails, Wire, 8d Common	9.365
		Wire, Barbed (80-rod spool)	8.402
		Woven Wire Fence (20-rod roll)	20.477

STEEL's FINISHED STEEL PRICE INDEX*

	May 15 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	228.59	228.59	227.41	210.45	171.92
Index in cents per lb	6.193	6.193	6.161	5.701	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

	May 15 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Finished Steel, NT	$140.24	$140.24	$139.71	$128.98	$106.32
No. 2 Fdry Pig Iron, GT	64.70	64.70	64.70	60.27	52.54
Basic Pig Iron, GT	64.23	64.23	64.23	59.80	52.16
Malleable Pig Iron, GT	65.77	65.77	65.77	61.27	53.27
Steelmaking Scrap, GT	45.00	44.33	42.67	51.00	43.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	May 15 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.075	5.075	5.075	4.65	3.70
Bars, H.R., Chicago	5.075	5.075	5.075	4.65	3.70
Bars, H.R., deld., Philadelphia	5.365	5.365	5.365	4.93	4.223
Bars, C.F., Pittsburgh	6.85*	6.85*	6.85*	6.25*	4.55
Shapes, Std., Pittsburgh	5.00	5.00	5.00	4.60	3.65
Shapes, Std., Chicago	5.00	5.00	5.00	4.60	3.65
Shapes, deld., Philadelphia	5.31	5.31	5.31	5.00	3.93
Plates, Pittsburgh	4.85	4.85	4.85	4.50	3.70
Plates, Chicago	4.85	4.85	4.85	4.50	3.70
Plates, Coatesville, Pa.	5.25	5.25	5.25	4.80	4.15
Plates, Sparrows Point, Md.	4.85	4.85	4.85	4.50	3.70
Plates, Claymont, Del.	5.70	5.70	5.70	5.35	4.15
Sheets, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.60-3.75
Sheets, H.R., Chicago	4.675	4.675	4.675	4.325	3.60
Sheets, C.R., Pittsburgh	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Chicago	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Detroit	5.75-5.85	5.75-5.85	5.75-5.85	5.325-5.425	4.55
Sheets, Galv., Pittsburgh	6.30	6.30	6.30	5.85	4.80
Strip, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.75-4.00
Strip, H.R., Chicago	4.675	4.675	4.675	4.325	3.50
Strip, C.R., Pittsburgh	6.85	6.85	6.85	6.25	4.65-5.35
Strip, C.R., Chicago	6.85	6.85	6.85	6.25-6.35	4.90
Strip, C.R., Detroit	6.95	6.95	6.95	6.35	4.85-5.60
Wire, Basic, Pittsburgh	7.20	7.20	7.20	6.60	4.85-5.10
Nails, Wire, Pittsburgh	8.49	8.49	8.49	7.60	5.90-6.20
Tin plate (1.50 lb) box, Pitts.	$10.30	$10.30	$9.95	$9.85	$8.70

*Including 0.35c for special quality.

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$91.50	$91.50	$91.50	$84.50	$66.00
Wire rods, 7/32-5/8" Pitts.	5.80	5.80	5.80	5.375	4.10-4.30

PIG IRON, Gross Ton	May 15 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pitts.	$65.50	$65.50	$65.50	$61.00	$53.00
Basic, Valley	64.50	64.50	64.50	60.00	52.00
Basic, deld., Phila.	68.38	68.38	68.38	63.76	56.75
No. 2 Fdry, NevilleIsland, Pa.	65.00	65.00	65.00	60.50	52.50
No. 2 Fdry, Chicago	65.00	65.00	65.00	60.50	52.50
No. 2 Fdry, deld., Phila.	68.88	68.88	68.88	64.26	57.25
No. 2 Fdry, Birm.	59.00	59.00	59.00	55.00	48.88
No. 2 Fdry (Birm.) deld. Cin.	66.70	66.70	66.70	62.70	55.49
Malleable, Valley	65.00	65.00	65.00	60.50	52.50
Malleable, Chicago	65.00	65.00	65.00	60.50	52.50
Ferromanganese, Duquesne	255.00†	255.00†	255.00†	215.00†	188.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$44.50	$44.50	$41.50	$49.50	$44.00
No. 1 Heavy Melt, E. Pa.	50.00	49.00	46.00	54.00	42.50
No. 1 Heavy Melt, Chicago	40.50	39.50	39.50	49.50	42.50
No. 1 Heavy Melt, Valley	43.50	41.50	41.50	53.50	44.00
No. 1 Heavy Melt, Cleve.	38.50	38.50	38.50	49.50	43.00
No. 1 Heavy Melt, Buffalo	40.50	40.50	41.50	53.50	43.00
Rails, Rerolling, Chicago	58.50	56.50	56.50	72.50	52.50
No. 1 Cast, Chicago	40.50	39.50	39.50	52.50	49.00

COKE, Net Ton					
Beehive, Furn., Connlsvl.	$15.25	$15.25	$15.25	$14.125	$14.75
Beehive, Fdry., Connlsvl.	18.00	18.00	18.00	16.50	17.50

How you benefit from Electro-Alloys'

ENLARGED MACHINING AND CLEANING ROOM FACILITIES

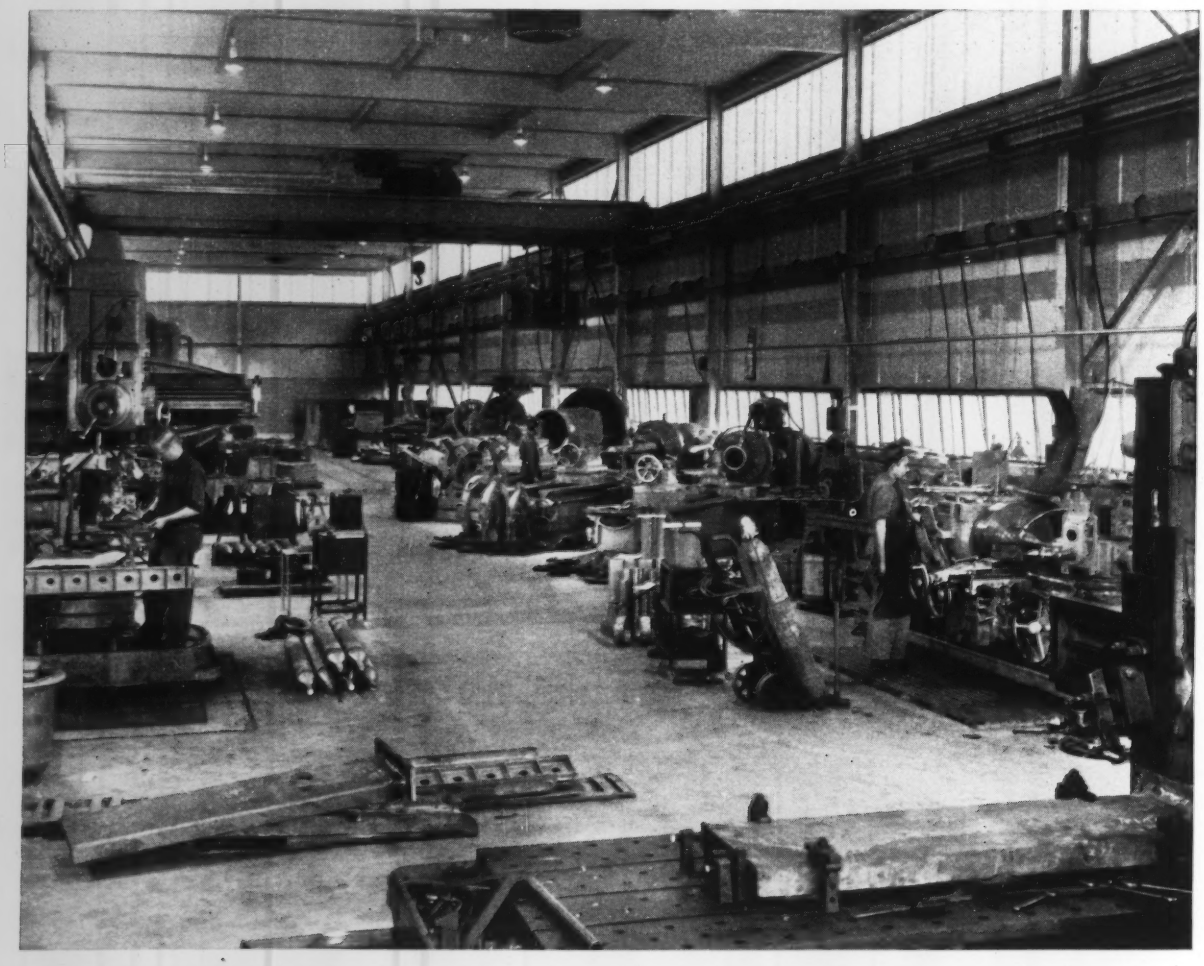
Thermalloy high-alloy castings* are being produced in greater variety, size and quantity than ever before. To meet the increasing demands of our customers, new and enlarged machine shop and cleaning room facilities have recently been installed.

What does this mean to you? It means we can handle more and varied jobs faster. We can machine large castings to your specifications on the most modern type of equipment . . . lathes, shapers, milling machines, key seaters, drill presses, planers, grinders.

Our new cleaning room addition includes Wheelabrator, tumbling machine, abrasive cutoff machines, grinders, welding booths and casting storage. It is serviced by a crane to facilitate handling of large castings.

Why not take advantage of these enlarged, modern facilities on your next high alloy casting job? Call your nearest Electro-Alloys representative, or write us direct for information and quotes. Electro-Alloys Division, 8045 Taylor Street, Elyria, Ohio.

*Reg. U.S. Pat. Off.



AMERICAN Brake Shoe COMPANY

ELECTRO-ALLOYS DIVISION Elyria, Ohio

Steel Prices

Mill prices as reported to STEEL, May 15, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 246; to footnotes, page 248.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 .....$70.50

INGOTS, Alloy (NT)

Detroit R7 .....$74.00
Houston S5 .....74.00
Midland,Pa. C18 .....74.00
Munhall,Pa. U5 .....74.00

BILLETS, BLOOMS & SLABS

Carbon, Rerolling (NT)

Bessemer,Pa. U5 ....$74.00
Bridgeport,Conn. N19 ..79.00
Buffalo R2 .....74.00
Clairton,Pa. U5 .....74.00
Ensley,Ala. T2 .....74.00
Fairfield,Ala. T2 .....74.00
Fontana,Calif. K1 ....83.50
Gary,Ind. U5 .....74.00
Johnstown,Pa. B2 ....74.00
Lackawanna,N.Y. B2 ..74.00
LoneStar,Tex. L6 .....80.00
Munhall,Pa. U5 .....74.00
S.Chicago,Ill. R2, U5 .74.00
S.Duquesne,Pa. U5 ...74.00
Sterling,Ill. N15 .....74.00
Youngstown R2 .....74.00

Carbon, Forging (NT)

Bessemer,Pa. U5 ....$91.50
Bridgeport,Conn. N19 ..96.50
Buffalo R2 .....91.50
Canton,O. R2 .....94.00
Clairton,Pa. U5 .....91.50
Conshohocken,Pa. A3 ..96.50
Ensley,Ala. T2 .....91.50
Fairfield,Ala. T2 .....91.50
Fontana,Calif. K1 ....101.00
Gary,Ind. U5 .....91.50
Geneva,Utah C11 ....91.50
Houston S5 .....96.50
Johnstown,Pa. B2 ....91.50
Lackawanna,N.Y. B2..91.50
LosAngeles B3 .....101.00
Midland,Pa. C18 .....91.50
Munhall,Pa. U5 .....91.50
Seattle B3 .....105.00
S.Chicago R2, U5, W14 91.50
S.Duquesne,Pa. U5 ...91.50
S.SanFrancisco B3 ...101.00

Alloy, Forging (NT)

Bethlehem,Pa. B2 ...$107.00
Bridgeport, Conn. N19.107.00
Buffalo R2 .....107.00
Canton,O. R2 .....107.00
Conshohocken,Pa. A3 .114.00
Detroit R7 .....107.00
Fontana,Calif. K1 ....128.00
Gary,Ind. U5 .....107.00
Houston S5 .....112.00
Ind.Harbor,Ind. Y1 ..107.00
Johnstown,Pa. B2 ....107.00
Lackawanna,N.Y. B2.107.00
LosAngeles B3 .....127.00
Massillon,O. R2 .....107.00
Midland,Pa. C18 .....107.00
Munhall,Pa. U5 .....107.00
S.Chicago R2,U5,W14 .107.00
S.Duquesne,Pa. U5 ..107.00
Struthers,O. Y1 .....107.00
Warren,O. C17 .....107.00

ROUNDS, SEAMLESS TUBE (NT)

Bridgeport,Conn. N19 $116.50
Buffalo R2 .....111.50
Canton,O. R2 .....114.00
Cleveland,O. R2 ....111.50
Gary,Ind. U5 .....111.50
S.Chicago,Ill. R2,W14.111.50
S.Duquesne,Pa. U5 ..111.50

SKELP

Aliquippa,Pa. J5 ....4.725
LoneStar,Tex. L6 ....5.025
Munhall,Pa. U5 .....4.625
Warren,O. R2 .....4.625
Youngstown R2, U5 ..4.625

WIRE RODS

AlabamaCity,Ala. R2 ..5.80
Aliquippa,Pa. J5 .....5.80
Alton,Ill. L1 .....6.00
Buffalo W12 .....5.80
Cleveland A7 .....5.80
Donora,Pa. A7 .....5.80
Fairfield,Ala. T2 .....5.80
Houston S5 .....6.05
IndianaHarbor,Ind. Y1 ..5.80
Johnstown,Pa. B2 .....5.80
Joliet,Ill. A7 .....5.80
KansasCity,Mo. S5 ....6.05
Kokomo,Ind. C16 .....5.90
LosAngeles B3 .....6.60
Minnequa,Colo. C10 ....6.05
Monessen,Pa. P17 .....5.80
N.Tonawanda,N.Y.B11 ..5.80
Pittsburg,Calif. C11 ....6.60
Portsmouth,O. P12 .....5.80
Roebling,N.J. R5 .....5.90
S.Chicago,Ill. R2 .....5.80
SparrowsPoint,Md. B2 ..5.90
Sterling,Ill.(1) N15 ...5.80
Sterling,Ill. N15 .....5.90
Struthers,O. Y1 .....5.80
Worcester,Mass. A7 ....6.10

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2 .....5.00
Atlanta A11 .....5.20
Aliquippa,Pa. J5 .....5.00
Bessemer,Ala. T2 .....5.00
Bethlehem,Pa. B2 .....5.05
Birmingham C15 .....5.00
Clairton,Pa. U5 .....5.00
Fairfield,Ala. T2 .....5.00
Fontana,Calif. K1 .....5.75
Gary,Ind. U5 .....5.00
Geneva,Utah C11 .....5.00
Houston S5 .....5.10
Ind.Harbor,Ind. I-2 ....5.00
Johnstown,Pa. B2 .....5.05
Joliet,Ill. P22 .....5.00
KansasCity,Mo. S5 ....5.10
Lackawanna,N.Y. B2 ..5.05
LosAngeles B3 .....5.70
Minnequa,Colo. C10 ....5.30
Munhall,Pa. U5 .....5.00
Niles,Calif. P1 .....5.65
Phoenixville,Pa. P4 ....5.85
Portland,Oreg. O4 .....5.75
Seattle B3 .....5.75
S.Chicago,Ill. U5, W14.5.00
S.SanFrancisco B3 ....5.65
Sterling,Ill. N15 .....5.00
Torrance,Calif. C11 ....5.70
Weirton,W.Va. W6 ....5.00

Wide Flange

Bethlehem,Pa. B2 .....5.05
Clairton,Pa. U5 .....5.00
Fontana,Calif. K1 .....5.90
IndianaHarbor,Ind. I-2 .5.25
Lackawanna,N.Y. B2 ..5.05
Munhall,Pa. U5 .....5.00
Phoenixville,Pa. P4 .....5.85
S.Chicago,Ill. U5 .....5.00

Alloy Std. Shapes

Aliquippa,Pa. J5 .....6.20
Clairton,Pa. U5 .....6.20
Gary,Ind. U5 .....6.20
Houston S5 .....6.30
Munhall,Pa. U5 .....6.20
S.Chicago,Ill. U5 .....6.20

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5 .....7.35
Bessemer,Ala. T2 .....7.35
Bethlehem,Pa. B2 .....7.40
Clairton,Pa. U5 .....7.35
Fairfield,Ala. T2 .....7.35
Fontana,Calif. K1 .....8.10
Gary,Ind. U5 .....7.35
Geneva,Utah C11 .....7.35
Houston S5 .....7.45
Ind.Harbor,Ind. I-2, Y1.7.35
Lackawanna,N.Y. B2 ..7.40
KansasCity,Mo. S5 ....7.45
Lackawanna,N.Y. B2 ..7.40
LosAngeles B3 .....8.05
Munhall,Pa. U5 .....7.35
Seattle B3 .....8.10
S.Chicago,Ill. U5, W14..7.35
S.SanFrancisco B3 ....8.00
Struthers,O. Y1 .....7.35

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 .....7.40
Lackawanna,N.Y. B2 ..7.40
Munhall,Pa. U5 .....7.35
S.Chicago,Ill. U5 .....7.35

PILING

BEARING PILES

Bethlehem,Pa. B2 .....5.05
Lackawanna, N.Y. B2 ..5.05
Munhall,Pa. U5 .....5.00
S.Chicago,Ill. U5 .....5.00

STEEL SHEET PILING

Lackawanna,N.Y. B2 ..5.90
Munhall,Pa. U5 .....5.90
S.Chicago,Ill. U5 .....5.90

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 .....4.85
Aliquippa,Pa. J5 .....4.85
Ashland,Ky.(15) A10 ..4.85
Bessemer,Ala. T2 .....4.85
Clairton,Pa. U5 .....4.85
Claymont,Del. C22 ....5.70
Cleveland J5, R2 .....4.95
Coatesville,Pa. L7 .....5.25
Conshohocken,Pa. A3 ..4.95
Detroit M1 .....4.95
Ecorse,Mich. G5 .....4.95
Fairfield,Ala. T2 .....4.85
Fontana,Calif.(30) K1 ..5.60
Gary,Ind. U5 .....4.85
Geneva,Utah C11 .....4.85
GraniteCity,Ill. G4 .....5.05
Harrisburg,Pa. P4 ....5.80
Houston S5 .....4.95
Ind.Harbor,Ind. I-2, Y1 4.85
Johnstown,Pa. B2 .....4.85
Lackawanna,N.Y. B2 ..4.85
LoneStar,Tex. L6 .....5.20
Minnequa,Colo. C10 ....5.70
Munhall,Pa. U5 .....4.85
Newport,Ky. A2 .....4.85
Pittsburgh J5 .....4.85
Riverdale,Ill. A1 .....4.85
Seattle B3 .....5.75
Sharon,Pa. S3 .....4.85
S.Chicago,Ill. U5, W14 4.85
SparrowsPoint,Md. B2 ..4.85
Sterling,Ill. N19 .....4.85
Steubenville,O. W10 ....4.85
Warren,O. R2 .....4.85
Youngstown R2, U5, Y1.4.85

PLATES, Carbon Abras. Resist.

Claymont,Del. C22 ....6.20
Fontana,Calif. K1 .....7.00
Geneva,Utah C11 .....6.25
Johnstown,Pa. B2 .....5.65
SparrowsPoint,Md. B2 ..5.65

PLATES, Wrought Iron

Economy,Pa. B14 ....11.95

PLATES, H.S., L.A.

Aliquippa,Pa. J5 .....7.25
Bessemer,Ala. T2 .....7.25
Clairton,Pa. U5 .....7.25
Claymont,Del. C22 ....7.55
Cleveland J5, R2 .....7.25
Coatesville,Pa. L7 ....7.55
Conshohocken,Pa. A3 ..7.25
Ecorse,Mich. G5 .....7.35
Fairfield,Ala. T2 .....7.25
Fontana,Calif.(30) K1 ..8.00
Gary,Ind. U5 .....7.25
Geneva,Utah C11 .....7.25
Houston S5 .....7.35
Ind.Harbor,Ind. I-2, Y1..7.25
Johnstown,Pa. B2 .....7.25
Munhall,Pa. U5 .....7.25
Pittsburgh J5 .....7.25
Seattle B3 .....8.15
Sharon,Pa. S3 .....7.25
S.Chicago,Ill. U5, W14..7.25
SparrowsPoint,Md. B2 ..7.25
Warren,O. R2 .....7.25
Youngstown U5, Y1 ....7.25

PLATES, Alloy

Aliquippa,Pa. J5 .....6.85
Claymont,Del. C22 ....6.85
Coatesville,Pa. L7 .....6.85
Fontana,Calif.(30) K1 ..7.60
Gary,Ind. U5 .....6.85
Houston S5 .....6.95
Ind.Harbor,Ind. Y1 ....6.85
Johnstown,Pa. B2 .....6.85
Munhall,Pa. U5 .....6.85
Newport,Ky. A2 .....6.85
Pittsburgh J5 .....6.85
Seattle B3 .....7.75
Sharon,Pa. S3 .....6.85
S.Chicago,Ill. U5, W14..6.85
SparrowsPoint,Md. B2 ..6.85
Youngstown Y1 .....6.85

FLOOR PLATES

Cleveland J5 .....5.925
Conshohocken,Pa. A3 ..5.925
Harrisburg,Pa. P4 ....6.275
Ind.Harbor,Ind. I-2 ..5.925
Munhall,Pa. U5 .....5.925
S.Chicago,Ill. U5 ....5.925

PLATES, Ingot Iron

Ashland c.l. (15) A10..5.10
Ashland l.c.l. (15) A10..5.60
Cleveland c.l. R2 .....5.60
Warren,O. c.l. R2 .....5.60

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2 ..5.075
Aliquippa,Pa.(9) J5 ....5.075
Alton,Ill. L1 .....5.275
Atlanta(9) A11 .....5.275
Bessemer,Ala.(9) T2 ..5.075
Birmingham(9) C15 ....5.075
Bridgeport,Conn. N19 ..5.30
Buffalo(9) R2 .....5.075
Clairton,Pa.(9) U5 ....5.075
Cleveland(9) R2 .....5.075
Ecorse,Mich.(9) G5 ....5.175
Emeryville,Calif. J7 ..5.825
Fairfield,Ala.(9) T2 ..5.075
Fairless,Pa.(9) U5 ....5.225
Fontana,Calif.(9) K1 ..5.775
Gary,Ind.(9) U5 .....5.075
Houston(9) S5 .....5.325
Ind.Harbor(9) I-2, Y1..5.075
Johnstown,Pa.(9) B2 ..5.075
Joliet,Ill. P22 .....5.075
KansasCity,Mo.(9) S5..5.325
Lackawanna(9) B2 ....5.075
LosAngeles(9) B3 ....5.775
Milton,Pa. M18 .....5.225
Minnequa,Colo. C10 ..5.525
Niles,Calif. P1 .....5.775
N.Tonawanda,N.Y.(9)B11 5.425
Pittsburg,Calif.(9) C11.5.775
Pittsburgh(9) J5 .....5.075
Portland,Oreg. O4 ....5.825
Seattle B3, N14 .....5.825
S.Chicago(9)R2,U5,W14 5.075
S.Duquesne,Pa.(9) U5 ..5.075
S.SanFran.,Calif.(9)B3 5.925
Sterling,Ill.(1) N15 ....5.075
Sterling,Ill. N15 .....5.175
Struthers,O. Y1 .....5.075
Tonawanda,N.Y. B12 ...5.45
Torrance,Calif.(9) C11 5.775
Youngstown(9) R2, U5 5.075

BARS, H.R. Leaded Alloy (Including leaded extra)

Warren,O. C17 .....7.125

BARS, Hot-Rolled Alloy

Aliquippa,Pa. J5 ....6.125
Bethlehem,Pa. B2 ....6.125
Bridgeport,Conn. N19 ..6.20
Buffalo R2 .....6.125
Canton,O. R2 .....6.125
Clairton,Pa. U5 .....6.125
Detroit R7 .....6.125
Ecorse,Mich. G5 .....6.225
Fairless,Pa. U5 .....6.275
Fontana,Calif. K1 ....7.175
Gary,Ind. U5 .....6.125
Houston S5 .....6.375
Ind.Harbor,Ind. I-2, Y1.6.125
Johnstown,Pa. B2 .....6.125
KansasCity,Mo. S5 ....6.375
Lackawanna,N.Y. B2 ..6.125
LosAngeles B3 .....7.175
Massillon,O. R2 .....6.125
Midland,Pa. C18 .....6.125
Pittsburgh J5 .....6.125
S.Chicago R2,U5,W14 ..6.125
S.Duquesne,Pa. U5 ....6.125
Struthers,O. Y1 .....6.125
Warren,O. C17 .....6.125
Youngstown U5 .....6.125

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5 .....7.425
Bessemer,Ala. T2 .....7.425
Bethlehem,Pa. B2 ....7.425
Bridgeport,Conn. N19 ..7.50
Clairton,Pa. U5 .....7.425
Cleveland R2 .....7.425
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.425
Fontana,Calif. K1 ....8.125
Gary,Ind. U5 .....7.425
Houston S5 .....7.675
Ind.Harbor,Ind. Y1 ...7.425
Johnstown,Pa. B2 ....7.425
KansasCity,Mo. S5 ....7.675
Lackawanna,N.Y. B2..7.425
LosAngeles B3 .....8.125
Pittsburgh J5 .....7.425
Seattle B3 .....8.175
S.Chicago,Ill. U5, W14.7.425
S.Duquesne,Pa. U5 ....7.425
S.SanFrancisco B3 ....8.175
Struthers,O. Y1 .....7.425
Youngstown U5 .....7.425

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2 ..5.225
Houston(9) S5 .....5.325
KansasCity,Mo.(9) S5..5.325
Lackawanna(9) B2 ....5.075
Sterling,Ill. N15 .....5.175
Sterling,Ill.(1) N15 ....5.075
Tonawanda,N.Y. B12 ...5.45

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 .....5.075
Atlanta A11 .....5.575
Joliet,Ill. P22 .....5.075
Niles,Calif. P1 .....5.85
Pittsburgh J5 .....5.075
Portland,Oreg. O4 .....5.85
SanFrancisco S7 .....5.95

BAR SHAPES, Hot-Rolled Alloy

Aliquippa,Pa. J5 .....6.20
Clairton,Pa. U5 .....6.20
Gary,Ind. U5 .....6.20
Houston S5 .....6.45
KansasCity,Mo. S5 .....6.45
Pittsburgh J5 .....6.20
Youngstown U5 .....6.20

BARS, C.F., Leaded Alloy (Including leaded extra)

Ambridge,Pa. W18 ....9.475
BeaverFalls,Pa. M12 ..9.475
Chicago W18 .....9.475
Cleveland C20 .....9.475
LosAngeles S30 .....11.10
LosAngeles P2 .....11.35
Monaca,Pa. S17 .....9.475
Newark,N.J. W18 .....9.65
Warren,O. C17 .....9.475

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ....6.85
BeaverFalls,Pa. M12,R2.6.85
Birmingham C15 .....7.45
Bridgeport,Conn. N19 ..7.20
Buffalo B5 .....6.90
Camden,N.J. P13 .....7.30
Carnegie,Pa. C12 .....6.85
Chicago W18 .....6.85
Cleveland A7, C20 ....6.85
Detroit B5, P17 .....7.05
Detroit R7 .....6.85
Donora,Pa. W8 .....6.85
Elyria,O. W8 .....6.85
FranklinPark,Ill. N5 ..6.85
Gary,Ind. U5 .....6.85
GreenBay,Wis. F7 .....6.85
Hammond,Ind. L2, M13.6.85
Hartford,Conn. R2 ....7.35
Harvey,Ill. B5 .....6.85
LosAngeles(49) S30 ....8.30
LosAngeles R2 .....8.75
LosAngeles P2 .....8.30
Mansfield,Mass. B5 ....7.40
Massillon,O. R2, R8 ...6.85
Midland,Pa. C18 .....6.85
Monaca,Pa. S17 .....6.85
Newark,N.J. W18 .....7.30
NewCastle,Pa. (17) B4..6.85
Pittsburgh J5 .....6.85
Plymouth,Mich. P5 ....7.10
Putnam,Conn. W18 ....7.40
Readville,Mass. C14 ....7.40
S.Chicago,Ill. W14 ....6.85
SpringCity,Pa. K3 .....7.30
Struthers,O. Y1 .....6.85
Waukegan,Ill. A7 .....6.85
Youngstown F3, Y1 ....6.85

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19.6.10

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ....8.325
BeaverFalls,Pa. M12,R2 8.325
Bethlehem,Pa. B2 .....8.325
Bridgeport,Conn. N19 ..8.475
Buffalo B5 .....8.325
Camden,N.J. P13 .....8.50
Canton,O. T7 .....8.325
Carnegie,Pa. C12 .....8.325
Chicago W18 .....8.325
Cleveland A7, C20 ....8.325
Detroit B5, P17 .....8.525
Detroit R7 .....8.325
Donora,Pa. A7 .....8.325
Elyria,O. W8 .....8.325
FranklinPark,Ill. N5 ..8.325
Gary,Ind. R2 .....8.325
GreenBay,Wis. F7 .....8.325
Hammond,Ind. L2,M13 8.325
Hartford,Conn. R2 ....8.625
Harvey,Ill. B5 .....8.325
LosAngeles S30 .....10.10
LosAngeles P2 .....10.20
Mansfield,Mass. B5 ....8.625
Massillon,O. R2, R8 ...8.325
Midland,Pa. C18 .....8.325
Monaca,Pa. S17 .....8.325
Newark,N.J. W18 .....8.50
Plymouth,Mich. P5 ....8.525
S.Chicago,Ill. W14 ....8.325
SpringCity,Pa. K3 .....8.50
Struthers,O. Y1 .....8.325
Warren,O. C17 .....8.325
Waukegan,Ill. A7 .....8.325
Worcester,Mass. A7 ....8.625
Youngstown F3, Y1 ....8.325

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 .....5.075
Atlanta A11 .....5.275
Birmingham C15 .....5.075
Bridgeport,Conn. N9 ...5.30
Buffalo R2 .....5.075
Cleveland R2 .....5.075
Ecorse,Mich. G5 .....5.425
Emeryville,Calif. J7 ...5.825

Fairfield,Ala. T2 .....5.075
Fairless,Pa. U5 .....5.225
Fontana,Calif. K1 ....5.775
Ft.Worth,Tex.(4) T4 ..5.525
Gary,Ind. U5 .....5.075
Houston S5 .....5.325
Ind.Harbor,Ind. I-2, Y1 5.075
Johnstown,Pa. B2 ....5.075
Joliet,Ill. P22 .....5.075
KansasCity,Mo. S5 ....5.325
Lackawanna,N.Y. B2..5.075
LosAngeles B3 .....5.775
Milton,Pa. M18 .....5.225
Minnequa,Colo. C10 ...5.525
Niles,Calif. P1 .....5.775
Pittsburg,Calif. C11 ...5.775
Pittsburgh J5 .....5.075
Portland,Oreg. O4 ....5.825
SandSprings,Okla. S5 ..5.575
Seattle B3, N14 .....8.825
S.Chicago,Ill. R2 .....5.075
S.Duquesne,Pa. U5 ....5.075
S.SanFrancisco B3 ....5.825
SparrowsPoint,Md. B2.5.075
Sterling Ill.(1) N15 ...5.075
Sterling,Ill. N15 .....5.175
Struthers O. Y1 .....5.075
Tonawanda,N.Y. B12 ..5.65
Torrance,Calif. C11 ...5.775
Youngstown R2, U5 ...5.075

BARS, Reinforcing (Fabricated; to Consumers)

Boston B2 .....7.30
Chicago U8 .....6.81
Cleveland U8 .....6.79
Johnstown,Pa. ¼-1" B2 6.73
KansasCity,Mo. S5 ....7.00
Lackawanna,N.Y. B2 ..6.50
Marion,O. P11 .....6.70
NewYork U8 .....7.20
Pittsburgh J5, U8 .....6.75
Seattle B3, N14 .....7.20
SparrowsPt. ½-1" B2 ..6.73
Williamsport,Pa. S19 ..6.65

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2 5.075
ChicagoHts.(4)(44) I-2 5.075
ChicagoHts.(4) C2 ....5.075
Ft.Worth,Tex.(26) T4..5.525
Franklin,Pa.(3) F5 ....5.10
Franklin,Pa.(4) F5 ...5.075
JerseyShore,Pa.(4) J8 ..5.10
Marion,O.(3) P11 .....5.10
Moline,Ill.(3) R2 .....5.225
Tonawanda(3) B12 ....5.15
Tonawanda(4) B12 ....5.65
Williamsport,Pa.(3) S19.5.15

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 13.15
Economy Pa.(D.R.)B14 16.35
Economy(Staybolt)B14, 16.80
McK.Rks.(S.R.) L5 ...13.15
McK.Rks.(D.R.) L5 ...18.00
McK.Rks.(Staybolt) L5 19.15

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 .....4.675
Allenport,Pa. P7 .....4.675
Ashland,Ky.(8) A10 ...4.675
Cleveland J5, R2 .....4.675
Conshohocken,Pa. A3 ..4.725
Detroit(8) M1 .....4.775
Ecorse,Mich. G5 .....4.775
Fairfield,Ala. T2 .....4.675
Fairless,Pa. U5 .....4.725
Fontana,Calif. K1 ....5.525
Gary,Ind. U5 .....4.675
Geneva,Utah C11 .....4.775
GraniteCity,Ill.(8) G4..4.875
Ind.Harbor,Ind. I-2, Y1 4.675
Irvin,Pa. U5 .....4.675
Lackawanna,N.Y. B2..4.675
Munhall,Pa. U5 .....4.675
Newport,Ky.(8) A2 ...4.675
Niles,O. M21 .....4.675
Pittsburg,Calif. C11 ..5.375
Pittsburgh J5 .....4.675
Portsmouth O. P12 ....4.675
Riverdale Ill. A1 .....4.675
Sharon,Pa. S3 .....4.675
S.Chicago,Ill. W14 ....4.675
SparrowsPoint,Md. B2..4.675
Steubenville,O. W10 ...4.675
Warren,O. R2 .....4.675
Weirton,W.Va. W6 ....4.675
Youngstown U5, Y1 ...4.675

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21 .....5.75

SHEETS, H.R. Alloy

Gary,Ind. U5 .....7.75
Ind.Harbor,Ind. Y1 ....7.75
Irvin,Pa. U5 .....7.75
Newport,Ky. A2 .....7.75
Youngstown U5, Y1 ....7.75

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Cleveland J5, R2 .....6.90
Conshohocken,Pa. A3 ..6.95
Ecorse,Mich. G5 .....7.00
Fairfield,Ala. T2 .....6.90
Fairless,Pa. U5 .....6.95
Fontana,Calif. K1 .....7.75
Gary Ind. U5 .....6.90
Ind.Harbor,Ind. I-2, Y1.6.90
Irvin,Pa. U5 .....6.90
Lackawanna(35) B2 ....6.90
Munhall,Pa. U5 .....6.90
Pittsburgh J5 .....6.90
S.Chicago,Ill. U5 .....6.90
SparrowsPoint(36) B2 ..6.90
Warren,O. R2 .....6.90
Weirton,W.Va. W6 .....6.90
Youngstown U5, Y1 ....6.90

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..4.925
Cleveland R2 .....5.425
Ind.Harbor,Ind. I-2 ...4.925
Warren,O. R2 .....5.425

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 .....5.75
Cleveland J5, R2 .....5.75
Conshohocken,Pa. A3 ...5.80
Detroit M1 .....5.75
Ecorse,Mich. G5 .....5.85
Fairfield,Ala. T2 .....5.75
Fairless,Pa. U5 .....5.80
Follansbee,W.Va. F4 ..5.75
Fontana,Calif. K1 .....7.00
Gary,Ind. U5 .....5.75
GraniteCity,Ill. G4 ....5.95
Ind.Harbor Ind. I-2, Y1.5.75
Irvin,Pa. U5 .....5.75
Lackawanna,N.Y. B2 ..5.75
Mansfield,O. E6 .....5.75
Middletown,O. A10 ....5.75
Newport,Ky. A2 .....5.75
Pittsburg,Calif. C11 ....6.70
Pittsburgh J5 .....5.75
Portsmouth,O. P12 .....5.75
SparrowsPoint,Md. B2 ..5.75
Steubenville,O. W10 ....5.75
Warren,O. R2 .....5.75
Weirton,W.Va. W6 .....5.75
Yorkville,O. W10 .....5.75
Youngstown Y1 .....5.75

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 .....8.525
Ecorse,Mich. G5 .....8.625
Fairless,Pa. U5 .....8.575
Fontana,Calif. K1 ....9.775
Gary,Ind. U5 .....8.525
IndianaHarbor,Ind. Y1.8.525
Irvin,Pa. U5 .....8.525
Lackawanna(37) B2 ..8.525
Pittsburgh J5 .....8.525
SparrowsPoint(38) B2.8.525
Warren,O. R2 .....8.525
Weirton,W.Va. W6 ....8.525
Youngstown Y1 .....8.525

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.50
Middletown,O. A10 ....6.25
Warren,O. R2 .....6.50

SHEETS, Culvert	Cu Steel	Cu Fe
Ashland,Ky. A10	6.65	6.90
Canton,O. R2	6.65	7.15
Fairfield T2	6.65	6.90
Gary,Ind. U5	6.65	6.90
GraniteCity,Ill. G4	6 85	...
Ind.Harbor I-2	6 65	6.90
Irvin,Pa. U5	6.65	6.90
Kokomo,Ind. C16	6.75	...
MartinsFry. W10	6 65	6.90
Pittsburgh J5	6.65	...
Pitts.,Calif. C11	7.40	...
SparrowsPt. B2	6.65	...

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....6.90

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 .....6.30‡
Ashland,Ky. A10 .....6.30†
Canton,O. R2 .....6.30‡
Dover,O. R1 .....6.30†
Fairfield,Ala. T2 .....6.30†
Gary,Ind. U5 .....6.30†
GraniteCity,Ill. G4 ....6.50*
Ind.Harbor Ind. I-2 ...6.30†
Irvin,Pa. U5 .....6.30†
Kokomo,Ind. C16 .....6.40‡
MartinsFerry O. W10 ..6.30*
Middletown,O. A10 ...6.30†
Pittsburg,Calif. C11 ...7.05*
Pittsburgh J5 .....6.30†
SparrowsPt.,Md. B2 ...6.30†
Warren,O. R2 .....6.30†
Weirton,W.Va. W6 ....6.30*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 .....7.025

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....9.275
SparrowsPoint(39) B2..9.275

SHEETS, Galvannealed Steel

Canton,O. R2 .....6.70
Irvin,Pa. U5 .....6.70

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....6.55
Middletown,O. A10 .....6.55

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.125
Niles,O.(28) R2 .....7.125
Weirton,W.Va. W6 ....6.975

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1)..8.95
Butler,Pa. A10 (type 2).9.05

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.325
Cleveland R2 .....6.325
Gary,Ind. U5 .....6.325
GraniteCity Ill. G4 ....6.525
Ind.Harbor,Ind. I-2, Y1 6.325
Irvin,Pa. U5 .....6.325
Middletown,O. A10 ....6.325
Niles,O. M21 .....6.325
Youngstown Y1 .....6.325

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ..8.35
Ind.Harbor,Ind. I-2 ...8.175
Yorkville,O. W10 .....8.175

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 6.70
Gary,Ind. U5 .....6.70
Mansfield,O. E6 .....6.70
Middletown,O. A10 ....6.70
Niles,O. M21 .....6.70
Weirton,W.Va. W6 .....6.70

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.10

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U.S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel D v., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Dearborn Divis.on, Sharon Steel Corp.
D4 Disston Division, H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E. Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Division, Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.
M22 Mill Strip Products Co.

N1 National Standard Co.
N2 National Supply Co.
N3 National Tube Div., U.S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mill
N15 Northwestern S.&W. Co.
N19 Northeastern Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co., Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts.Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn.Coal & Iron Div., U.S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U5 U.S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U.S. Steel Supply Div., U.S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.675
Allenport,Pa. P7	4.675
Alton,Ill. L1	4.875
Ashland,Ky.(8) A10	4.675
Atlanta A11	4.875
Bessemer,Ala. T2	4.675
Birmingham C15	4.675
Buffalo(27) R2	4.675
Conshohocken,Pa. A3	4.725
Detroit M1	4.775
Ecorse,Mich. G5	4.775
Fairfield,Ala. T2	4.675
Fontana,Calif. K1	5.525
Gary,Ind. U5	4.675
Houston S5	4.925
Ind.Harbor,Ind. I-2, Y1	4.675
Johnstown,Pa.(25) B2	4.675
KansasCity,Mo. S5	4.925
Lackaw'na,N.Y.(25) B2	4.675
LosAngeles(25) B3	5.425
Minnequa,Colo. C10	5.775
Pittsburg,Calif. C11	5.425
Riverdale,Ill. A1	4.675
SanFrancisco S7	5.95
Seattle(25) B3	5.675
Seattle N14	5.675
Sharon,Pa. S3	4.675
S.Chicago,Ill. W14	4.675
S.SanFrancisco(25) B3	5.425
SparrowsPoint,Md. B2	4.675
Sterling,Ill.(1) N15	4.675
Sterling,Ill. N15	4.775
Torrance,Calif. C11	5.425
Warren,O. R2	4.675
Weirton,W.Va. W6	4.675
Youngstown U5	4.675

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	7.75
Gary,Ind. U5	7.75
Ind.Harbor,Ind. Y1	7.75
LosAngeles B3	8.95
Newport,Ky. A2	7.75
Sharon,Pa. S3	7.75
S.Chicago,Ill. W14	7.75
Youngstown U5, Y1	7.75

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2	6.95
Conshohocken,Pa. A3	6.95
Ecorse,Mich. G5	7.05
Fairfield,Ala. T2	6.95
Gary,Ind. U5	6.95
Houston S5	7.20
Ind.Harbor,Ind. I-2, Y1	6.95
KansasCity,Mo. S5	7.20
Lackawanna,N.Y. B2	6.95
LosAngeles(25) B3	7.70
Seattle(25) B3	7.95
Sharon,Pa. S3	6.95
S.SanFrancisco(25) B3	7.70
SparrowsPoint,Md. B2	6.95
Warren,O. R2	6.95
Weirton,W.Va. W6	6.95
Youngstown U5, Y1	6.95

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.925
Warren,O. R2	5.425

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.85
Baltimore T6	6.85
Boston T6	7.40
Buffalo S40	6.85
Cleveland A7, J5	6.85
Conshohocken,Pa. A3	6.90
Dearborn Mich. D3	6.95
Detroit D2, M1, P20	6.95
Dover,O. G6	6.85
Ecorse,Mich. G5	6.95
Evanston Ill. M22	6.95
Follansbee,W.Va. F4	6.85
Fontana,Calif. K1	8.70
FranklinPark Ill. T6	6.95
Ind.Harbor,Ind. Y1	6.85
Indianapolis C8	7.00
LosAngeles C1	8.90
NewBedford,Mass. R10	7.30
NewBritain(10) S15	6.85
NewCastle,Pa. B4, E5	6.85
NewHaven,Conn. D2	7.30
NewKensington,Pa. A6	6.85
Pawtucket,R.I. R3	7.50
Pawtucket,R.I. N8	7.40
Pittsburgh J5	6.85
Riverdale,Ill. A1	6.95
Rome,N.Y.(32) R6	6.85
Sharon,Pa. S3	6.85
Trenton,N.J.(31) R5	8.30
Wallingford,Conn. W2	7.30
Warren,O. R2, T5	6.85
Weirton,W.Va. W6	6.85
Worcester,Mass. A7	7.40
Youngstown C8, Y1	6.85

STRIP, Cold-Rolled Alloy

Boston T6	14.90
Carnegie,Pa. S18	14.55
Cleveland A7	14.55
Dover,O. G6	14.55
FranklinPark,Ill. T6	14.55
Harrison,N.J. C18	14.55
Indianapolis C8	14.70
Pawtucket,R.I. N8	14.90
Sharon,Pa. S3	14.55
Worcester,Mass. A7	14.85
Youngstown C8	14.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.00
Dearborn,Mich. D3	10.10
Dover,O. G6	10.10
Ecorse,Mich. G5	10.10
Ind.Harbor,Ind. Y1	10.20
Sharon,Pa. S3	10.00
Warren,O. R2	10.00
Weirton,W.Va. W6	10.00
Youngstown Y1	10.20

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.20	10.40	12.60	15.60	18.55
Boston T6	9.20	10.40	12.60	15.60	18.55
Bristol,Conn. W1	....	10.40	12.60	15.60	18.55
Carnegie,Pa. S18	8.65	10.10	12.30	15.30	....
Cleveland A7	8.65	10.10	12.30	15.30	18.25
Cleveland C7	....	10.10	12.30	15.30	18.25
Dearborn,Mich. D3	8.75	10.20	12.40	....	....
Detroit D2	8.75	10.20	12.40	15.40	....
Dover,O. G6	8.65	10.10	12.30	15.30	18.25
Evanston,Ill. M22	8.65	10.10	12.30	....	....
FranklinPark,Ill. T6	8.75	10.10	12.30	15.30	18.25
Harrison,N.J. C18	....	....	12.60	15.60	18.55
Indianapolis C8	8.80	10.25	12.30	15.30	18.25
LosAngeles C1	10.85	12.30	14.50	....	....
NewBritain,Conn.(10) S15	8.65	10.10	12.30	15.30	18.25
NewCastle,Pa. B4, E5	8.65	10.10	12.30	15.30	....
NewHaven,Conn. D2	9.10	10.40	12.60	15.60	....
NewKensington,Pa. A6	8.65	10.10	12.30	15.30	....
New York W3	....	10.40	12.60	15.60	18.55
Pawtucket,R.I. N8	9.20	10.40	12.60	15.60	18.55
Riverdale,Ill. A1	8.75	10.10	12.30	15.30	18.25
Rome,N.Y.(32) R6	8.65	10.10	12.30	15.30	18.25
Sharon,Pa. S3	8.65	10.10	12.30	15.30	18.25
Trenton,N.J. R5	....	10.40	12.60	15.60	18.55
Wallingford Conn. W2	9.10	10.40	12.60	15.60	18.45
Warren,O. T5	8.65	10.10	12.30	15.30	18.25
Worcester,Mass. A7, T6	9.20	10.40	12.60	15.60	18.55
Youngstown C8	8.65	10.10	12.30	15.30	18.25

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	17.10	20.95	25.30
Buffalo W12	17.10	....	....
FranklinPark,Ill. T6	17.45	21.30	25.65
Harrison,N.J. C18	17.10	20.95	25.30
New York W3	17.10	20.95	25.30
Palmer,Mass. W12	17.10	....	....
Trenton,N.J. R5	17.10	20.95	25.30
Worcester,Mass. A7, T6	17.10	20.95	25.30
Youngstown C8	17.45	21.30	25.65

SILICON STEEL

H.R. SHEETS(22 Ga.,cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	....	11.00	12.05	13.05
Brackenridge,Pa. A4	....	....	11.00	12.05	13.05
Mansfield,O. E6	9.20	10.35	11.00	12.05	13.05
Newport,Ky. A2	9.20	10.35	11.00	12.05	13.05
Niles,O. M21	9.20	10.35	11.00	12.05	....
Vandergrift,Pa. U5	...	10.35	11.00	12.05	13.05
Warren,O. R2	9.20	10.35	11.00	12.05	....
Zanesville,O. A10	....	10.35	11.00	12.05	13.05
Zanesville,O. A10 (FP coils)	...	10.85	11.525	12.575	13.55
Zanesville,O. A10 (SP coils)	...	....	11.025	12.075	13.05

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge Pa. A4	...	....	11.525	12.575	13.55
GraniteCity,Ill. G4	9.40*	10.55*	11.225*	12.275*	....
IndianaHarbor Ind. I-2	9.20†	10.35*	11.025*	12.075*	....
Mansfield,O. E6	9.70	10.85	11.525	12.575	13.55
Vandergrift,Pa. U5	9.20*	10.35*	11.025*	12.075*	13.05*
Vandergrift,Pa. U5	...	10.85†	11.525†	12.575†	13.55†
Warren,O. R2	9.20*	10.85	11.525	12.575	13.55

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grades T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	14.05	14.60	15.10	16.15
Brackenridge,Pa. A4	14.05	....	....	....
Vandergrift,Pa. U5	14.05	14.60	15.10	16.15
Zanesville,O. A10	14.05	14.60	15.10	16.15

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	16.90	18.50	19.00	19.50	....
Butler,Pa. A10	....	....	18.50	19.00	19.50	....
Vandergrift,Pa. U5	15.90	16.90	18.50	19.00	19.50	14.55**
Warren,O. R2	....	....	....	....	....	14.55‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	7.60

STRIP, C.R. Electrogalvanized

Cleveland A7	6.85*
Dover,O. G6	6.85*
Evanston,Ill. M22	6.95
Riverdale,Ill. A1	6.95*
Warren,O. B9, T5	6.85*
Worcester,Mass. A7	7.40*
Youngstown C8	6.85*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	6.975

TIGHT COOPERAGE HOOP

Atlanta A11	5.40
Riverdale,Ill. A1	5.25
Sharon,Pa. S3	5.10
Youngstown U5	5.10

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb $5.75	0.50 lb $9.00	0.75 lb $9.40
Aliquippa,Pa. J5	8.85	9.10	9.50
Fairfield,Ala. T2	8.85	9.10	9.50
Fairless,Pa. U5	9.50	9.75	10.15
Fontana,Calif. K1	8.75	9.00	9.40
Gary,Ind. U5	8.85	9.10	9.50
GraniteCity,Ill. G4	8.75	9.00	9.40
IndianaHarbor,Ind. I-2, Y1	8.75	9.00	9.40
Irvin,Pa. U5	8.75	9.00	9.40
Niles,O. R2	9.50	9.75	10.15
Pittsburg,Calif. C11	8.85	9.10	9.50
SparrowsPoint,Md. B2	8.75	9.00	9.40
Weirton,W.Va. W6	8.75	9.00	9.40
Yorkville,O. W10			

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	7.425	7.625	....
Niles,O. R2	7.425	7.625	7.925

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa.J5	$10.05	$10.30
Fairfield,Ala.T2	10.15	10.40
Fairless,Pa. U5	10.15	10.40
Fontana,Calif.K1	10.80	11.05
Gary,Ind. U5	10.05	10.30
Irvin,Pa. U5	10.05	10.30
Pitts.,Calif. C11	10.80	11.05
Sp.Pt.,Md. B2	10.15	10.40
Weirton,W.Va.W6	10.05	10.30
Yorkville,O. W10	10.05	10.30

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$7.85
Fairfield,Ala. T2	7.95
Fairless,Pa. U5	7.95
Fontana,Calif. K1	8.60
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. I-2, Y1	7.85
Irvin,Pa. U5	7.85

Niles,O. R2	7.85
Pittsburg,Calif. C11	8.60
SparrowsPoint,Md. B2	7.95
Weirton,W.Va. W6	7.85
Yorkville,O. W10	7.85

HOLLOWARE ENAMELING Black Plate (29 Gage)	
Aliquippa,Pa. J5	$7.50
Gary,Ind. U5	7.50
GraniteCity,Ill. G4	7.60
Ind.Harbor,Ind. Y1	7.50
Irvin,Pa. U5	7.50
Yorkville,O. W10	7.50

MANUFACTURING TERNES (Special Coated; Base Box)	
Gary,Ind. U5	$9.70
Irvin,Pa. U5	9.70

ROOFING SHORT TERNES (8 lb Coated; Base Box)	
Gary,Ind. U5	$11.25

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	7.20
Aliquippa,Pa. J5	7.20
Alton,Ill. L1	7.40
Atlanta A11	7.40
Bartonville,Ill. K4	7.30
Buffalo W12	7.20
Chicago W13	7.20
Cleveland A7, C20	7.20
Crawfordsville,Ind. M8	7.30
Donora,Pa. A7	7.20
Duluth A7	7.20
Fairfield,Ala. T2	7.20
Fostoria,O.(24) S1	7.30
Houston S5	7.45
Jacksonville,Fla. M8	7.55
Johnstown,Pa. B2	7.20
Joliet,Ill. A7	7.20
KansasCity,Mo. S5	7.45
Kokomo,Ind. C16	7.30
LosAngeles B3	8.15
Minnequa,Colo. C10	7.45
Monessen,Pa. P7, P16	7.20
N.Tonawanda,N.Y. B11	7.20
Palmer,Mass. W12	7.50
Pittsburg,Calif. C11	8.15
Portsmouth,O. P12	7.20
Rankin,Pa. A7	7.20
S.Chicago,Ill. R2	7.20
S.SanFrancisco C10	8.15
SparrowsPoint,Md. B2	7.30
Sterling,Ill.(1) N15	7.20
Sterling,Ill. N15	7.30
Struthers,O. Y1	7.20
Waukegan,Ill. A7	7.20
Worcester,Mass. A7	7.50

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4	11.90
Buffalo W12	11.90
Cleveland A7	11.90
Donora,Pa. A7	11.90
Duluth A7	11.90
Johnstown,Pa. B2	11.90
Minnequa,Colo. C10	12.025
Monessen,Pa. P16	11.90
Muncie,Ind. I-7	12.10
NewHaven,Conn. A7	12.20
Palmer,Mass. W12	12.20
Pittsburg,Calif. C11	12.70
Portsmouth,O. P12	11.90
Roebling,N.J. R5	12.20
SparrowsPt.,Md. B2	12.00
Struthers,O. Y1	11.90
Trenton,N.J. A7	12.20
Waukegan,Ill. A7	11.90
Worcester,Mass. A7	12.20

WIRE, Upholstery Spring

Aliquippa,Pa. J5	8.70
Alton,Ill. L1	8.90
Buffalo W12	8.70
Cleveland A7	8.70
Donora,Pa. A7	8.70
Duluth A7	8.70
Johnstown,Pa. B2	8.70
KansasCity,Mo. S5	8.95
Minnequa,Colo. C10	8.90
LosAngeles B3	9.65
Monessen,Pa. P7, P16	8.70
NewHaven,Conn. A7	9.00
Palmer,Mass. W12	9.00
Pittsburg,Calif. C11	9.65
Portsmouth,O. P12	8.70
Roebling,N.J. R5	8.70
S.Chicago,Ill. R2	8.70
S.SanFrancisco C10	9.65
SparrowsPt.,Md. B2	8.80
Struthers,O. Y1	8.70
Trenton N.J. A7	9.00
Waukegan,Ill. A7	8.70
Worcester,Mass. A7	9.00

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	9.025
Alton,Ill. L1	9.225
Bartonville,Ill. K4	9.125
Buffalo W12	9.025
Cleveland A7	9.025
Donora,Pa. A7	9.025
Duluth A7	9.025
Fostoria,O. S1	9.075
Johnstown,Pa. B2	9.025
LosAngeles B3	9.975
Milbury,Mass.(12) N6	9.325
Minnequa,Colo. C10	9.275
Monessen,Pa. P7, P16	9.025
Muncie Ind. I-7	9.225
Palmer,Mass. W12	9.325
Pittsburg,Calif. C11	9.975
Portsmouth,O. P12	9.025
Roebling,N.J. R5	9.025
S.Chicago,Ill. R2	9.025
S.SanFrancisco C10	9.975
SparrowsPt. Md. B2	9.125
Struthers,O. Y1	9.025
Trenton N.J. A7	9.325
Waukegan,Ill. A7	9.025
Worcester J4, T6, W12	9.325
Worcester,Mass. A7	9.325

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	14.65
Bartonville,Ill. K4	14.25
Buffalo W12	14.45
Chicago W13	14.45
Cleveland A7	14.45
Crawfordsville Ind. M8	14.25
Fostoria,O. S1	14.45
Jacksonville Fla. M8	14.50
Johnstown,Pa. B2	14.45
Kokomo,Ind. C16	14.45
Monessen,Pa. P6	14.45
Muncie Ind. I-7	14.65
Palmer,Mass. W12	14.75
Roebling,N.J. C10	14.45
S.SanFrancisco C10	14.80
Waukegan Ill. A7	14.45
Worcester,Mass. A7, T6	14.75

ROPE WIRE

Bartonville Ill. K4	12.00
Buffalo W12	12.90
Fostoria,O. S1	12.00
Johnstown Pa. B2	12.00
Monessen,Pa. P7	12.00
Muncie,Ind. I-7	12.20
Palmer,Mass. W12	12.30
Portsmouth,O. P12	12.00
Roebling,N.J. R5	12.30
SparrowsPt.,Md., B2	12 10
Struthers,O. Y1	12.00
Worcester,Mass. J4	12.30
(A) Plow and Mild Plow; add 0.25c for Improved Plow	

WIRE

WIRE, Tire Bead

Bartonville,Ill. K4	15.75
Monessen,Pa. P16	15.45
Roebling,N.J. R5	16.10

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	10.75
Baltimore T6	11.05
Boston T6	11.05
Buffalo W12	10.75
Chicago W13	10.85
Cleveland A7	10.75
Crawfordsville,Ind. M8	10.75
Dover,O. G6	10.75
Fostoria,O. S1	11.05
FranklinPark,Ill. T6	10.85
Kokomo,Ind. C16	10.75
Massillon,O. R8	10.75
Milwaukee C23	10.95
Monessen,Pa. P7, P16	10.75
NewKensington,Pa. A6	10.75
Palmer,Mass. W12	11.05
Pawtucket,R.I. N8	11.05
Riverdale,Ill. A1	10.85
Rome,N.Y. R6	10.75
Trenton,N.J. R5	11.05
Worcester,Mass. A7, T6	11.05

NAILS & POLISHED STAPLES,

Stock	Col.
AlabamaCity,Ala. R2	.164
Aliquippa,Pa. J5	.164
Atlanta A11	.166
Bartonville,Ill. K4	.166
Crawfordsville,Ind. M8	.166
Donora,Pa. A7	.164
Duluth A7	.164
Fairfield,Ala. T2	.164
Houston,Tex. S5	.169
Jacksonville,Fla.(20) M8	175
Johnstown,Pa. B2	.164
Joliet,Ill. A7	.164
KansasCity,Mo. S5	.169
Kokomo,Ind. C16	.166
Minnequa,Colo. C10	.169
Monessen,Pa. P7	.164
Pittsburg,Calif. C11	.183
Rankin,Pa. A7	.164
S.Chicago,Ill. R2	.164
SparrowsPt.,Md. B2	.166
Sterling,Ill. (7) N15	.166
Worcester,Mass. A7	.170

NAILS, Stock

	Col.
Chicago W13	.164
Cleveland A9	.170

(To Wholesalers; per cwt)

Galveston,Tex. D7	$8.75

NAILS, Cut (100 lb keg)
To Dealers (33)

Conshohocken,Pa. A3	$9.80
Wheeling,W.Va. W10	9.80

TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box)
Coil No. 3150

AlabamaCity,Ala. R2	$9.82
Atlanta A11	9.63
Bartonville,Ill. K4	9.63
Buffalo W12	9.82
Chicago W13	9.82
Crawfordsville,Ind. M8	9.63
Donora,Pa. A7	9.82
Duluth A7	9.82
Fairfield,Ala. T2	9.82
Houston S5	10.07
Jacksonville,Fla. M8	10.09
Johnstown,Pa. B2	9.82
Joliet,Ill. A7	9.82
KansasCity,Mo. S5	10.07
Kokomo,Ind. C16	9.92
LosAngeles B3	10.61
Minnequa,Colo. C10	10.07
Pittsburg,Calif. C11	10.60
S.Chicago,Ill. R2	9.82
S.SanFrancisco C10	10.60
SparrowsPt.,Md. B2	9.92
Sterling,Ill.(37) N15	9.82

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$10.15
Atlanta A11	9.95
Bartonville,Ill. K4	9.95
Buffalo W12	10.15
Chicago W13	10.15
Crawfordsville,Ind. M8	9.95
Donora,Pa. A7	10.15
Duluth A7	10.15
Fairfield,Ala. T2	10.15
Houston S5	10.40
Jacksonville,Fla. M8	10.41
Johnstown,Pa. B2	10.15
Joliet,Ill. A7	10.15
KansasCity,Mo. S5	10.40
Kokomo,Ind. C16	10.25
LosAngeles B3	10.95
Minnequa,Colo. C10	10.40
Pittsburg,Calif. C11	10.95
S.Chicago,Ill. R2	10.15
S.SanFrancisco C10	10.95
SparrowsPt.,Md. B2	10.25
Sterling,Ill.(37) N15	10.15

Coil Interim

AlabamaCity,Ala. R2	$10.20
Atlanta A11	10.00
Bartonville,Ill. K4	10.00
Buffalo W12	10.20
Chicago W13	10.20
Crawfordsville,Ind. M8	10.00
Donora,Pa. A7	10.20
Duluth A7	10.20
Fairfield,Ala. T2	10.20
Houston S5	10.45
Jacksonville,Fla. M8	10.46
Johnstown,Pa. B2	10.20
Joliet,Ill. A7	10.20
KansasCity,Mo. S5	10.45
Kokomo,Ind. C16	10.30
LosAngeles B3	11.00
Minnequa,Colo. C10	10.45
Pittsburg,Calif. C11	11.00
S.Chicago,Ill. R2	10.20
S.SanFrancisco C10	11.00
SparrowsPt.,Md. B2	10.30
Sterling,Ill. (37) N15	10.20

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	196
Atlanta A11	192
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	196
Duluth A7	196
Fairfield,Ala. T2	196
Houston S5	201
Jacksonville,Fla. M8	197
Joliet,Ill. A7	190
KansasCity,Mo. S5	201
Kokomo,Ind. C16	198
Minnequa,Colo. C10	201
Pittsburg,Calif. C11	220
S.SanFrancisco C10	220
Sterling,Ill. (7) N15	196
SparrowsPt.,Md. B2	198
Tonawanda,N.Y. B12	169
Williamsport,Pa. S19	175

FENCE POSTS

ChicagoHts.,Ill. C2, I-2	.167
Duluth A7	.167
Franklin,Pa. F5	.167
Huntington,W.Va. W7	.169
Johnstown,Pa. B2	.167
Marion,O. P11	.167
Minnequa,Colo. C10	.172
Sterling,Ill.(1) N15	.167
Tonawanda,N.Y. B12	.169
Williamsport,Pa. S19	.175

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	.184**
Aliquippa,Pa. J5	.181‡
Atlanta A11	.190*
Bartonville,Ill. K4	.190
Crawfordsville,Ind. M8	.190
Donora,Pa. A7	.184†
Duluth A7	.184†
Fairfield,Ala. T2	.184†
Houston,Tex. S5	.189**
Jacksonville,Fla. M8	.195
Johnstown,Pa. B2	.188*
Joliet,Ill. A7	.184†
KansasCity,Mo. S5	.189**
Kokomo,Ind. C16	.186†
Minnequa,Colo. C10	.189**
Monessen,Pa. P7	.188*
Pittsburg,Calif. C11	.204†
Rankin,Pa. A7	.184†
S.Chicago,Ill. R2	.184**
S.SanFrancisco C10	.204**
SparrowsPoint,Md. B2	.190*
Sterling,Ill.(7) N15	.190*

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	176**
Aliq'ppa,Pa. 9-14½ga.J5	179‡
Atlanta A11	182*
Bartonville,Ill. K4	182
Crawfordsville,Ind. M8	182
Donora,Pa. A7	176†
Duluth A7	176†
Fairfield,Ala. T2	176†
Houston,Tex. S5	181**
Jacksonville,Fla. M8	187
Johnstown,Pa.(43) B2	180*
Joliet,Ill. A7	176†
KansasCity,Mo. S5	181**
Kokomo,Ind. C16	178†
Minnequa,Colo. C10	181**
Monessen,Pa. 9 ga. P7	180*
Pittsburg,Calif. C11	199†
Rankin,Pa. A7	176†
S.Chicago,Ill. R2	176**
Sterling,Ill.(7) N15	182*

WIRE (16 gage) Stone	An'ld Galv. Stone
Ala.City,Ala. R2	16.00 17.55**
Aliq'ppa,Pa. J5	15.70 17.50
Bartonville,Ill. K4	15.80 17.75
Buffalo W12	16.10 ....
Cleveland A7	16.00 ....
Crawf'dsville,Ind. M8	15.80 17.75
Fostoria,O. S1	16.50 18.05†
Houston S5	16.25 17.80**
Jacksonville,Fla. M8	16.05 18.00
Johnstown,Pa. B2	16.00 17.95*
Kansas City,Mo. S5	16.25 ....
Kokomo,Ind. C16	16.10 17.65†
Minnequa,Colo. C10	16.25 17.80*
P'lm'r,Mass. W12	16.30 17.85†
Pitts.,Calif. C11	16.35 17.90†
SparrowsPt.,Md. B2	16.10 18.05*
Sterling,Ill.(37) N15	16.00 17.95*
Waukegan A7	16.00-17.55†
Worcester,Mass. A7	16.30 ....

WIRE, Merchant Quality

(6 to 8 gage)	An'ld Galv.
Ala.City,Ala. R2	8.20 8.75**
Aliquippa,Pa. J5	7.95 8.475‡
Atlanta (48) A11	8.05 8.65*
Bartonville(48) K4	8.05 8.65
Buffalo W12	8.20 8.75†
Cleveland A7	8.20 ....
Crawfordsville M8	8.05 8.65
Donora,Pa. A7	8.20 8.75†
Duluth A7	8.20 8.75†
Fairfield T2	8.20 8.75†
Houston(48) S5	8.45 9.00**
Jacks'ville,Fla. M8	8.30 8.90
Johnstown B2(48)	8.20 8.95*
Joliet,Ill. A7	8.20 8.75†
Kans.City(48) S5	8.45 9.00**
Kokomo C16	8.30 8.85†
LosAngeles B3	9.15 9.90*
Minnequa C10	8.45 9.00‡
Monessen P7(48)	7.95 8.55*
Palmer,Mass. W12	8.50 9.05†
Pitts.,Calif. C11	9.15 9.70†
Rankin,Pa. A7	8.20 8.75†
S.Chicago R2	8.20 8.75**
S.SanFran. C10	9.15 9.70*
Spar'wsPt. B2(48)	8.30 9.05*
Sterling(37)(48)N15	8.35 9.10
Struth'rs,O.(48)Y1	8.20 8.85‡
Worcester,Mass.A7	8.50 9.05†

Based on zinc price of: *13.50c. †5c. ‡10c. ‡Less than 10c. ††13c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts
Full Size Body (cut thread)

½ in. and smaller:	
6 in. and shorter	52.5
Lower than 6 in.	43.5
⅝ in. thru 1 in:	
6 in. and shorter	43.5
Longer than 6 in.	41.5
1⅛ in. and larger:	
All lengths	41.5

Undersized Body (rolled thread)

½ in. and smaller:	
6 in. and shorter	52.5

Carriage, Machine,Lag Bolts
Hot Galvanized:

½ in. and smaller:	
6 in. and shorter	32.0
Longer than 6 in.	19.0
⅝ in. thru 1 in.:	
6 in. and shorter	16.0
Longer than 6 in.	16.0
1⅛ in. and larger:	
All lengths	16.0

Lag Bolts
All diameters:

6 in. and shorter	52.5
Longer than 6 in.	44.5

Plow and Tap Bolts

½ in. and smaller by 6 in. and shorter	52.0
Larger than ½ in. or longer than 6 in.	44.5
Blank Bolts	44.5
Step, Elevator, Tire Bolts	52.0
Stove Bolts, Slotted	
⅛ to ¼-in. incl., 3 in. and shorter	54.00
⅛ to ½-in., inclusive	54.00

NUTS

Reg. & Heavy Square Nuts:	
All sizes	58.0
Square Nuts, Reg. & Heavy, Hot Galvanized:	
All sizes	44.0
Hex Nuts, Reg. & Heavy, Hot Pressed:	
¾ in. and smaller	61.5
⅞ in. to 1 in., incl.	57.5
1⅛ in. to 1½ in., incl.	62.5
1⅝ in. and larger	56.0
Hex Nuts, Reg. & Heavy, Cold Punched:	
¾ in. and smaller	61.5
⅞ in. to 1½ in., incl.	57.5
1⅝ in. and larger	56.0
Hex Nuts, All Types, Hot Galvanized:	
¾ in. and smaller	48.0
⅞ in. to 1 in., incl.	44.0
1⅛ in. to 1½ in., incl.	49.0
Hex Nuts, Semifinished, Heavy (Incl. Slotted):	
¾ in. and smaller	61.5
⅞ in. to 1½ in., incl.	57.5
1⅝ in. and larger	56.0
Hex Nuts, Finished (Incl. Slotted and Castellated):	
1 in. and smaller	64.00
1⅛ in. to 1½ in., incl.	60.5
1⅝ in. and larger	56.0

Semifinished Hex Nuts, Reg. (Including Slotted):

⅝ in. and smaller	61.5
¾ in. to 1-in., incl.	64.0
1⅛ in. to 1½ in., incl.	60.5
1⅝ in. and larger	56.0

CAP AND SET SCREWS

(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Cap Screws, Coarse or Fine Thread, Bright:

6 in. and shorter:	
⅝ in. and smaller	44.0
¾, ⅞ and 1 in. diam.	27.0
Longer than 6 in.:	
⅝ in. and smaller	14.0
¾, ⅞ and 1 in. diam.	0.5

High Carbon, Heat Treated:

6 in. and shorter:	
⅝ in. and smaller	31.0
¾, ⅞ and 1 in. diam.	9.0
Longer than 6 in.:	
⅝ in. and smaller	+ 6
¾, ⅞ and 1 in. diam.	+24

Flat Head Cap Screws:

¾ in. and smaller	+65.0

Set Screws, Square Head, Cup Point, Coarse Thread

Through 1 in. diam.:	
6 in. and shorter	11
Longer than 6 in.	+10

RIVETS

F.o.b Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.
Structural ½-in., larger 11.50
⅞-in. under List less 23%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	24.55	23.54
1¼	13	....	29.07	23.36
1½	13	27.45	32.14	25.83
1¾	13	32.43	37.97	30.51
2	13	36.34	42.56	34.20
2¼	13	40.93	47.94	38.52
2½	12	44.42	52.03	41.81
2¾	12	48.94	57.31	46.05
3	12	52.99	62.05	49.88
3¼	12	56.51	66.18	53.19

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails All No. 2	Tee Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	5.275	5.175	5.225	6.25
Ensley,Ala. T2	5.275	5.175	....	6.25
Fairfield,Ala. T2	....	....	....	6.25
Huntington,W.Va. C15	....	....	....	6.25
Gary,Ind. U5	5.275	5.175	5.225	...
IndianaHarbor,Ind. I-2	5.275	5.175	5.225	...
Johnstown,Pa. B2	....	....	....	(16)6.25
Lackawanna,N.Y. B2	5.275	5.175	....	6.25
Minnequa,Colo. C10	5.275	5.175	....	6.75
Steelton,Pa. B2	5.275	5.175	....	...
Williamsport,Pa. S19	....	....	....	6.15

TIE PLATES

Fairfield,Ala. T2	6.275
Gary,Ind. U5	6.275
Ind.Harbor,Ind. I-2	6.275
Lackawanna,N.Y. B2	6.275
Minnequa,Colo. C10	6.275
Seattle B3	6.425
Steelton,Pa. B2	6.275
Torrance,Calif. C11	6.425

JOINT BARS

Bessemer,Pa. U5	6.60
Fairfield,Ala. T2	6.60
Ind.Harbor,Ind. I-2	6.60
Joliet,Ill. U5	6.60
Lackawanna,N.Y. B2	6.60
Minnequa,Colo. C10	6.60
Steelton,Pa. B2	6.60

AXLES

Ind.Harbor,Ind. S13	8.35
Johnstown,Pa. B2	8.35

TRACK BOLTS, Untreated

Cleveland R2	13.85
KansasCity,Mo. S5	13.85
Lebanon,Pa. B2	13.85
Minnequa,Colo. C10	13.85
Pittsburgh P14	13.10
Seattle B3	14.35

SCREW SPIKES

Lebanon,Pa. B2	13.60
Pittsburgh P14	12.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	9.225
Ind.Harbor,Ind. I-2, Y1	9.225
KansasCity,Mo. S5	9.225
Lebanon,Pa. B2	9.225
Minnequa,Colo. C10	9.225
Pittsburgh J5	9.225
Seattle B3	9.725
S.Chicago,Ill. R2	9.225
Struthers,O. Y1	9.225
Youngstown R2	9.225

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 5/16 in.; 6.23c; 1 15/16 to 8 in.; inclusive, 6.60c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn. base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.685c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝-in.; 7.30c, for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½-in. and smaller rounds; 8.65c, over 3½-in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+5.25	+21.75	1.25	+16.5	3.75	+14	5.25	+12.5	5.25	+12.5	5	+12.75	7.5	+10.25
Ambridge, Pa. N2	+5.25	....	1.25	....	3.75	....	5.25	....	5.25	....	5	....	7.5	....
Lorain, O. N3	+5.25	+21.75	1.25	+16.5	3.75	+14	5.25	+12.5	5.25	+12.5	5	+12.75	7.5	+10.25
Youngstown Y1	+5.25	+21.75	1.25	+16.5	3.75	+14	5.25	+12.5	5.25	+12.5	5	+12.75	7.5	+10.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+5.25	+21.75	1.25	+16.5	3.75	+14	5.25	+12.5	5.25	+12.5	5	+12.75	7.5	+10.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	9.25	+8	12.25	+4	15.75	0.5	18.25	1.75
Alton, Ill. L1	....	....	....	....	....	....	7.25	+10	10.25	+6	13.75	+1.5	16.25	+0.25
Benwood, W. Va. W10	6.5	+22	+4.75	+30.25	+14.75	+39.25	9.25	+8	12.25	+4	15.75	0.5	18.25	1.75
Butler, Pa. F6	7.5	+21	+3	+28.5	+12.5	+37	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	9.25	+8	12.25	+4	15.75	0.5	18.25	1.75
Fairless, Pa. N3	....	....	....	....	....	....	7.25	+10	10.25	+6	13.75	+1.5	16.25	+0.25
Fontana, Calif. K1	....	....	....	....	....	....	3.75	+21	+0.75	+17	2.75	+12.5	5.25	+11.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	8.25	+9	11.25	+5	14.75	+0.5	17.25	+0.75
Lorain, O. N3	....	....	....	....	....	....	9.25	+8	12.25	+4	15.75	0.5	18.25	1.75
Sharon, Pa. S4	6.5	+22	+4	+29.5	+13.5	+38	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	9.25	+8	12.25	+4	15.75	0.5	18.25	1.75
Sparrows Pt., Md. B2	5.5	+23	+0.5	+30.5	+14.5	+39	7.25	+10	10.25	+6	13.75	+1.5	16.25	+0.25
Wheatland, Pa. W9	7.5	+21	+3	+28.5	+12.5	+37	9.25	+8	12.25	+4	15.75	0.5	18.25	1.75
Youngstown R2, Y1	....	....	....	....	....	....	9.25	+8	12.25	+4	15.75	0.5	18.25	1.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	18.75	2.75	19.25	3.25	20.75	3.5	20.75	3.5	....	....	....	....
Alton, Ill. L1	16.75	0.75	17.25	1.25	18.75	1.5	18.75	1.5	....	....	....	....
Benwood, W. Va. W10	18.75	2.75	19.25	3.25	20.75	3.5	20.75	3.5	10.25	+7.5	10.25	+7.5
Etna, Pa. N2	18.75	2.75	19.25	3.25	20.75	3.5	20.75	3.5	10.25	+7.5	10.25	+7.5
Fairless, Pa. N3	16.75	0.75	17.25	1.25	18.75	1.5	18.75	1.5	8.25	+9.5	8.25	+9.5
Fontana, Calif. K1	5.75	+10.25	6.25	+9.75	7.75	+9.5	7.75	+9.5	+2.75	+20.5	+2.75	+20.5
Indiana Harbor, Ind. Y1	17.75	1.75	18.25	2.25	19.75	2.5	19.25	2.5	9.25	+8.5	9.25	+8.5
Lorain, O. N3	18.75	2.75	19.25	3.25	20.75	3.5	20.75	3.5	....	....	....	....
Sharon, Pa. M6	18.75	2.75	19.25	3.25	20.75	3.5	20.75	3.5	....	....	....	....
Sparrows Pt., Md. B2	16.75	0.75	17.25	1.25	18.75	1.5	18.75	1.5	8.25	+9.5	8.25	+9.5
Wheatland, Pa. W9	18.75	2.75	19.25	3.25	20.75	3.5	20.75	3.5	10.25	+7.5	10.25	+7.5
Youngstown R2, Y1	18.75	2.75	19.25	3.25	20.75	3.5	20.75	3.5	10.25	+7.5	10.25	+7.5

*Galvanized pipe discounts based on current price of zinc (12.00c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	21.25	26.00	....	34.50	....	40.50	42.50	46.75	43.25
202	22.75	29.00	35.00	37.50	39.25	41.25	43.25	47.25	47.25
301	22.25	27.00	35.75	35.75	40.25	42.50	44.50	49.25	45.75
302	24.25	30.25	36.50	39.00	41.00	43.25	45.50	50.00	50.00
302B	24.50	31.50	39.25	44.00	43.25	45.50	47.50	54.75	54.75
303	....	30.75	39.50	....	44.00	46.25	48.00	54.50	54.50
304	26.00	32.00	39.00	42.50	43.75	46.00	48.75	53.25	53.25
304L	....	....	46.50	49.50	51.25	53.50	56.25	60.75	60.75
305	27.50	35.25	40.75	45.75	43.75	46.00	49.25	56.50	56.50
308	29.50	36.75	45.50	48.25	50.75	53.50	58.00	60.50	60.50
309	38.25	47.50	55.50	62.00	61.25	64.50	68.25	77.50	77.50
310	47.75	59.25	75.00	81.00	83.25	87.50	89.25	93.00	93.00
314	....	....	....	....	83.25	....	80.25	....	100.50
316	38.25	47.50	59.75	66.50	66.75	70.25	73.75	78.25	78.25
316L	....	....	67.25	73.00	74.25	77.75	81.25	85.75	85.75
317	46.25	57.75	73.75	84.75	83.00	87.25	90.00	97.00	97.00
321	31.00	38.50	45.25	51.50	50.50	53.25	57.50	63.00	63.00
18-8 CbTa	35.50	44.75	53.50	61.00	59.25	62.25	67.00	76.25	76.25
403	....	....	30.75	....	34.50	36.25	38.75	46.50	46.50
405	18.75	24.50	28.50	34.50	32.50	34.00	36.00	45.00	45.00
410	16.00	20.75	27.25	29.75	31.00	32.50	33.75	38.75	38.75
416	....	....	27.75	....	31.50	33.00	34.75	46.50	46.50
420	....	32.25	33.00	40.25	37.75	39.75	43.50	59.50	59.50
430	16.25	21.00	27.75	30.75	31.50	33.00	34.50	39.25	39.25
430F	....	....	28.25	....	32.00	33.50	35.25	49.75	49.75
431	....	27.75	36.25	....	40.50	42.50	44.25	53.75	53.75
446	....	....	37.75	56.75	42.50	44.75	46.00	67.25	67.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Div., H. K. Porter Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U.S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; National-Standard Co.; National Tube Div., U.S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

Stainless	Plates—Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
302	....	....	....	....	35.50
304	33.15	36.20	40.30	44.50	37.75
304-L	35.40	38.80	43.15	47.65	....
316	38.35	41.60	45.90	50.15	55.50
316-L	43.55	47.60	52.70	57.85	....
316-Cb	43.85	48.10	53.40	58.75	....
321	34.90	37.95	42.10	46.40	44.75
347	37.05	41.25	46.45	51.70	54.25
405	27.55	29.20	33.15	37.05	....
410	27.00	28.70	32.65	36.55	....
430	27.00	28.70	32.65	36.55	....
Inconel	47.25	57.90	68.50	79.20	....
Nickel	40.00	50.30	60.65	71.05	....
Nickel, Low Carbon	40.30	50.95	61.65	72.50	....
Monel	41.70	51.90	62.15	72.40	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	33.00	39.85

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.290	Cr Hot Work	0.45-0.495
Extra Carbon	0.345	W-Cr Hot Work	0.43-0.475
Special Carbon	0.41-0.45	V-Cr Hot Work	0.460
Oil Hardening	0.450	Hi-Carbon-Cr	0.830

Grade by Analysis (%) W	Cr	V	Co	Mo		$ per lb
20.25	4.25	1.6	12.25	....	....	4.170
18.25	4.25	1	4.75	....	....	2.385
18	4	2	9	....	....	2.755
18	4	2	....	....	....	1.845
18	4	1	....	....	....	1.680
9	3.5	..	....	....	....	1.275
13.5	4	3	....	....	....	1.945
13.75	3.75	2	5	....	....	2.325
6.4	4.5	1.9	....	5	....	1.185
6	4	3	....	6	....	1.430
1.5	4	1	....	8.5	....	1.040

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malleable	Bessemer
Alabama City, Ala. R2	58.50	59.00	....	....
Birmingham R2	58.50	59.00‡	....	....
Birmingham U6	....	59.00‡	63.00	....
Woodward, Ala. W15	58.50**	59.00‡	63.00	....
Cincinnati, deld.	....	66.70	....	....
Buffalo District				
Buffalo H1, R2	64.50	65.00	65.50	66.00
Tonawanda, N.Y. W12	64.50	65.00	65.50	66.00
N. Tonawanda, N.Y. T9	....	65.00	65.50	66.00
Boston, deld.	75.79	76.29	76.79	....
Rochester, N.Y., deld.	67.52	68.02	68.52	....
Syracuse, N.Y., deld.	68.62	69.12	69.62	....
Chicago District				
Chicago I-3	64.50	65.00	65.00	65.50
S. Chicago, Ill. R2	64.50	....	65.00	....
S. Chicago, Ill. Y1	64.50	65.00	65.00	....
S. Chicago, Ill. W14	64.50	....	65.00	65.50
Milwaukee, deld.	66.96	67.46	67.46	67.96
Muskegon, Mich., deld.	....	78.83	78.83	...
Cleveland District				
Cleveland R2, A7	64.50	65.00	65.00	65.50
Akron, O., deld.	67.62	68.12	68.12	68.62
Mid-Atlantic District				
Birdsboro, Pa. B10	66.50	67.00	67.50	68.00
Chester, Pa. P4	66.50	67.00	67.50	....
Swedeland, Pa. A3	66.50	67.00	67.50	68.00
New York, deld.	....	73.20	73.70	....
Newark, N.J., deld.	70.52	71.02	71.52	72.02
Philadelphia, deld.	68.38	68.88	69.38	69.88
Troy, N.Y. R2	66.50	67.00	67.50	68.00
Pittsburgh District				
Neville Island, Pa. P6	64.50	65.00	65.00	65.50
Pittsburgh (N&S sides), Aliquippa, deld.	....	66.45	66.45	66.98
McKees Rocks, Pa., deld.	....	66.10	66.10	66.63
Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld.	....	66.76	66.76	67.29
Verona, Trafford, Pa., deld.	66.79	67.32	67.32	67.85
Brackenridge, Pa., deld.	67.10	67.60	67.60	68.13
Midland, Pa. C18	64.50	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malleable	Bessemer
Hubbard, O. Y1	....	....	65.00	....
Sharpsville, Pa. S6	64.50	....	65.00	65.50
Youngstown Y1	....	....	65.00	65.50
Mansfield, O., deld.	69.40	....	69.90	70.40
Duluth I-3	64.50	65.00	65.00	65.50
Erie, Pa. I-3	64.50	65.00	65.00	65.50
Everett, Mass. E1	66.00	66.50	67.00	....
Fontana, Calif. K1	72.50	73.00	....	....
Geneva, Utah C11	64.50	65.00	....	....
Granite City, Ill. G4	66.40	66.90	67.40	....
Ironton, Utah C11	64.50	65.00	....	....
Minnequa, Colo. C10	66.50	67.00	67.50	....
Rockwood, Tenn. T3	....	59.00‡	63.00	....
Toledo, O. I-3	64.50	65.00	65.00	65.50
Cincinnati, deld.	71.04	71.54	....	....

**Phos. 0.70-0.90%; Phos. 0.30-0.60%, $59.50.
†Phos. 0.70-0.90%; Phos. 0.30-0.50%, $60.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, O. I-3, J1	77.25
Buffalo H1	78.50

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$105.50
Niagara Falls, N.Y. P15	105.50
Keokuk, Iowa Open-hearth & Fdry. $9 freight allowed K2	103.50
Keokuk, Iowa O.H. & Fdry. 12½ lb piglets, 16% Si, max frgt allowed up to $9. K2	106.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles, Tenn. T3 (Phos. 0.035% max)	$78.50
Rockwood, Tenn. T3 (Phos. 0.035% max)	78.50
Troy, N.Y. R2 (Phos. 0.035% max)	72.50
Philadelphia, deld.	80.26
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	69.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	69.50
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	69.50
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	69.50

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Houston, Seattle no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††[3]		Carbon	Floor
Atlanta	8.17§	9.37§	9.83§	....	8.21	8.45	10.23	....	8.59	8.55	10.51
Baltimore	7.88	8.98	9.31	....	8.36	8.53	9.13[3]	14.68	8.75	8.26	9.76
Birmingham	7.80	9.00	9.52	....	7.82	8.07	10.12	....	8.20	8.16	10.31
Boston	8.84	9.88	11.06	60.42	8.89	9.07	....	14.69	9.10	9.18	10.68
Buffalo	7.85	9.00	10.75	....	8.05	8.25	8.70	14.50	8.50	8.50	10.05
Chattanooga	7.99	9.24	9.10	....	8.00	8.24	10.04	....	8.44	8.40	10.26
Chicago	7.78	9.00	9.80	53.25	7.82	8.07	8.35	14.15	8.20	8.16	9.49
Cincinnati	7.94	9.05	9.75	50.00	8.14	8.38	8.84	14.46	8.74	8.52	9.78
Cleveland	7.78	8.98	9.60	53.43	7.92	8.16	8.60	14.24	8.57	8.39	9.72
Denver	9.70	11.30	12.49	....	9.80	9.95	10.65	18.89	9.80	9.70	11.40
Detroit	8.03	9.25	10.05	59.86	8.17	8.37	8.70	14.41	8.74	8.51	9.74
Erie, Pa.	7.85	9.00	9.60[10]	....	7.95	8.20	8.70[10]	....	8.50	8.35	9.75
Houston	8.80	9.75	10.99	....	7.75	8.05	9.15	15.00	8.00	8.80	10.30
Jackson, Miss.	8.09	9.34	9.79	....	8.16	8.41	10.23	....	8.54	8.50	10.34
Los Angeles	9.10	12.30	11.25	57.45	9.15	9.20	12.10	15.50	9.15	9.65	11.80
Milwaukee	7.93	9.13	9.93	....	7.95	8.20	8.58	14.28	8.41	8.29	9.62
Moline, Ill.	8.13	9.35	10.05	....	8.17	8.42	8.70	....	8.55	8.51	...
New York	8.45	9.66	10.23	60.20	8.90	9.01	....	14.59	8.91	9.01	10.31
Norfolk, Va.	8.05	...	....	....	8.55	8.60	10.80	....	8.95	8.45	9.95
Philadelphia	8.15	9.07	10.29	59.69	8.82	8.71	9.31	14.51	8.70	8.63	9.70
Pittsburgh	7.78	8.99	10.05	59.00	7.92	8.07	8.60	14.15	8.20	8.16	9.49
Portland, Oreg.	9.20	11.20	11.60	55.20	11.05‡‡	9.35	13.80	14.60	9.35	9.00	12.20
Richmond, Va.	8.00	...	10.14	....	8.55	8.40	10.00	....	8.95	8.40	9.90
St. Louis	8.14	9.34	10.16	73.36	8.19	8.43	8.96	14.51	8.67	8.52	9.86
St. Paul	8.39	9.59	10.31	....	8.43	8.68	9.21	....	8.94	8.90	10.10
San Francisco	9.05	10.95	10.90	53.45	9.05	9.15	12.40	15.60	9.15	9.30	11.55
Seattle	9.55	10.70	11.65	55.20	9.55	9.50	13.40	15.85	9.35	9.30	11.70
Spokane, Wash.	9.55	10.70	11.65	....	9.55	9.50	13.40	16.60	9.35	9.30	11.70
Washington	8.48	9.58	....	....	9.06	9.13	9.73	....	9.35	8.86	10.36

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50c zinc at Los Angeles and 13.50c at other points), except in Birmingham (coating extra excluded); ‡includes 35-cent bar quality extras; §42 in. and under; **½-in. and heavier; ††as annealed; ‡‡over 4 in.; §§over 3 in.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [3]—400 to 999 lb; [5]—1000 to 1999 lb; [8]—2000 to 3999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beach Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $135; Salina, Pa., $140; Niles, O., $138; Cutler, Utah, $165.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $175; Stevens Pottery, Ga., $185; Cutler, Utah, $233.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, O., Hawstone, Pa., $150; Warren, Niles, Windham, O., Hays, Latrobe, Morrisville, Pa., $155; E. Chicago, Ind., Joliet, Rockdale, Ill., $160; Lehigh, Utah, $175; Los Angeles, $180.

Super-Duty: Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $157; Morrisville, Latrobe, Pa., $160; E. Chicago, Ind., $167; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $145; Woodbridge, N. J., $135; Philadelphia, $130.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., $100; Clearfield, Pa., Portsmouth, O., $102.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $235; Danville, Ill., $238; Philadelphia, Clearfield, Pa., $230; Orviston, Pa., $245.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $295; Danville, Ill., $298; Philadelphia, Clearfield, Orviston, Pa., $305.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $335; Danville, Ill., $338; Philadelphia, Clearfield, Orviston, Pa., $345.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $188.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Nario, O., $16; Thornton, McCook, Ill., $16.35; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ¼-in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜-in. grains with fines: Baltimore, $72.40.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34-$35; Mexican, all-rail, duty paid, $27-$27.75; barge, Brownsville, Tex., $27.75-$29.

Ores

Lake Superior Iron Ore

(Prices effective for the 1957 shipping season, gross tons, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old range bessemer	11.85
Old range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic 62-64% concentrates	25.00-27.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	27.00-27.50
N. African hematite (spot)	nom.
Brazilian iron ore, 68-69%	35.00-36.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$23.00-24.00
Domestic, concentrates, mine	55.00

Manganese Ore

Mn 46-48%, Indian (export tax included), $1.60-1.70 per long ton unit, c.i.f. U.S. ports, duty for buyer's account; other than Indian, $1.45-1.50; contracts by negotiation.

Chrome Ore

Gross ton f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48%	*3:1*	*$55.00-58.00*
48%	*2.8:1*	*52.00-55.00*
48%	*no ratio*	*46.00-48.00*

South African Transvaal

48%	*no ratio*	*$40.00-41.00*
44%	*no ratio*	*30.00-31.00*

Turkish

48%	*3:1*	*$59.00-62.00*

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.18

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$3.10-3.60
60-65%	3.60-3.80

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, Swedish: Deld. east of Mississippi river, ocean bags 23,000 lb and over. F.o.b. Riverton or or Camden, N.J., west of Mississippi river	10.50 / 9.50
Sponge Iron, domestic, 98 + % Fe: Deld. east of Mississippi river, 23,000 lb and over. F.o.b. Riverton, N.J., west of Mississippi river	10.50 / 9.50
Sponge Iron, Canadian: F.o.b. shipping point	9.50
Electrolytic Iron: Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	26.00
Annealed, 99.5% Fe	36.50
Unannealed (99+ % Fe)	34.00
Unannealed (99+ % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)	29.00
Carbonyl Iron: 98.1-99.9%, 3 to 20 microns, depending on grade, 99.00-290.00, in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 500 lb drum, frght allowed Carlots	38.20
Ton lots	40.20
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	34.80-43.20†
Bronze, 5000-lb lots	52.80-57.20†
Copper: Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese: Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.065
Nickel-Silver, 5000-lb lots	53.30-57.60†
Phosphor-Copper, 5000-lb lots	62.00
Copper (atomized) 5000-lb lots	44.50-52.00‡
Silicon	47.50
Solder	7.00*
Stainless Steel, 304	$1.08
Stainless Steel, 316	$1.44
Tin	14.50*
Zinc, 5000-lb lots	19.75-33.00‡
Tungsten: Dollars	
Melting grade, 99% 60 to 2000 mesh: 1000 lb and over	4.00
Less than 1000 lb	4.15
Chromium, electrolytic 99.8% Cr min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Diam.	Length	Per 100 lb
2	24	$57.75
2½	30	37.25
3	40	35.25
4	40	33.25
5⅛	40	33.00
6	60	30.00
7	60	26.75
8, 9, 10	60	26.50
12	72	25.50
14	60	25.50
16	72	24.50
17	60	25.50
18	72	24.50
20	72	24.00
24	84	24.75

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.75-15.75
Connellsville, foundry	17.50-18.50

Oven Foundry Coke

Birmingham, ovens	$28.85
Cincinnati, deld.	33.78
Buffalo, ovens	30.50
Camden, N. J., ovens	29.50
Detroit, ovens	30.50
Pontiac, deld.	32.25
Saginaw, deld.	33.83
Erie, Pa., ovens	30.50
Everett, Mass., ovens New England, deld.	31.55*
Indianapolis, ovens	29.75
Ironton, O., ovens	29.00
Cincinnati, deld.	29.27
Kearny, N. J., ovens	29.75
Milwaukee, ovens	30.50
Painesville, O., ovens	30.50
Cleveland, deld.	32.69
Philadelphia, ovens	29.50
St. Louis, ovens	31.50
Neville Island (Pittsburgh), Pa., ovens	29.25
St. Paul, ovens	29.75
Chicago, deld.	33.14
Swedeland, Pa., ovens	29.50
Terre Haute, Ind., ovens	29.75

*Or within $4.80 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$7.15	$7.15	$7.15	$7.40
Bar Size Angles	6.95	6.95	6.95	7.05
Structural Angles	7.10	7.10	7.10	7.30
I-Beams	7.50	7.50	7.50	7.75
Channels	7.55	7.55	7.55	7.80
Plates (basic bessemer)	9.00	9.00	9.00	9.30
Sheets, H.R.	8.55	8.55	8.55	8.85
Sheets, C.R. (drawing quality)	8.95	8.95	8.95	9.35
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	27.17	27.17	27.17	27.64
Barbed Wire (†)	6.80	6.80	6.80	7.25
Merchant Bars	6.95	6.95	6.95	7.30
Hot-Rolled Bands	7.15	7.15	7.15	7.55
Wire Rods, Thomas Commercial No. 5	6.38	6.38	6.38	6.78
Wire Rods, O-H Cold Heading Quality No. 5	6.72	6.72	6.72	7.12
Bright Common Wire Nails (§)	8.40	8.40	8.40	8.57

†Per 82-lb, net, reel. §Per 100-lb kegs, 20d nails and heavier.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx). Base price per net ton; $255, Johnstown, Duquesne, Sheridan, Pa., Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74% respectively.

(Mn 79-81%). Lump $263 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-90%). Carload, lump, bulk, max, 0.07% C, 35.1c lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delievered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.00% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn, packed, carload 26.8c, ton lot 28.4c, less ton 29.6c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max). Carload, lump, bulk 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lot 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 34c; 2000 lb to min carload, 36c; 500 lb to 1999 lb, 38c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l. lump, bulk, 27.75c per lb of contained Cr; c.l. packed 29.3c, ton lot 31.05c; less ton 32.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract carload, lump, bulk, C 0.025% max (Simplex) 34.75c per lb contained Cr, 0.02% max 41.5c, 0.03% max 41c, 0.06% max 39.5c, 0.1% max 39c, 0.15% max 38.75c, 0.2% max 38.5c, 0.5% max 38.25c, 1.0% max 37.5c, 1.5% max 37.35c, 2.0% max 37.25c. Ton lot, add 3.4c, less ton add 5.1c. Carload packed add 1.75c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l., 2 in. x D, bulk 29.05c per lb contained Cr. Packed, c.l. 30.65c, ton 32.45c, less ton 33.95c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8M x D, 20.85c, per lb of alloy, ton lot 22.10c; less ton lots 23.3c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 41.35c per lb of contained Cr; 1" x down, bulk 42.35c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ¼" thick) $1.29 per lb, ton lot $1.31, less ton lot $1.33. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 13c per lb of contained Si. Packed c.l. 15.5c, ton lot 16.95c, less ton 18.6c, f.o.b. Alloy, W. Va., Ashtabula, Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 15.25c per lb contained silicon. Packed, c.l. 17.25c, ton lot, 19.05c; less ton 20.4c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 16.4c per lb of contained Si. Packed, c.l. 18.30c, ton lot 19.95c, less ton 21.2c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 19.5c per lb of contained Si. Packed, c.l. 21.15c, ton lot 22.55c, less ton 23.6c. Delivered. Spot add 0.25c.

Silicon Metal: (98% min Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Deduct 0.5c for max 1% Fe grade analyzing min 99.75% Si; 0.75c for max 1.25% Fe grades analyzing min 96.75% Si. Spot, add 0.25c.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 27.25c per lb of alloy, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Bortam: (B 1.5%-1.9%). Ton lot, 45c per lb; less than ton lot, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carload 9.50 per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3½ lb each and containing 2 lb of Cr). Contract, carload, bulk, 19c per lb of briquet, carload packed in box pallets 19.2c, in bags 20.1c; 3000 lb to c.l. in box pallets 20.4c; 2000 lb to c.l. in bags, 21.3c; less than 2000 lb in bags 22.2c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Contract, carload, bulk 14.8c per lb of briquet; c.l., packed, pallets 15c, bags 16c; 3000 lb to c.l., pallets 16.2c; 2000 lb to c.l. bags, 17.2c; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). Contract, c.l. bulk 15.1c per lb of briquet; c.l. packed, pallets, 15.3c; bags 16.3c, 3000 lb to c.l., pallets, 16.5c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si). Contract, carload, bulk, 7.7c per lb of briquet; packed, pallets, 7.9c; bags 8.9c; 3000 lb to c.l., pallets 9.5c; 2000 lb to c.l. bags 10.5c; less ton 11.4c. Delivered. Spot, add 0.25c. (Small size—weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 7.85c. Packed, pallets 8.05c; bags 9.05c; 3000 lb to c.l. pallets 9.65c; 2000 lb to c.l. bags 10.65c; less ton 11.55c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.41 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.95 per lb of contained W; 2000 lb W to 5000 lb W, $3.05; less than 2000 lb W, $3.17. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $5.10 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lot 2" x D, $4.25 per lb of contained Cb plus Ta, delivered; less ton lot $5.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, c.l. packed ½-in. x 12 M 19c per lb of alloy, ton lot 20.15c, less ton 21.4c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5.7%, Ti 9-11%). C.l. packed, 19c per lb of alloy, ton lot 20.15c; less ton lot 21.4c, f.o.b. Niagara Falls, N. Y.; Freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.1c per lb of alloy; ton lot 19.55c; less ton lot 20.8c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 18.50c. Packed c.l. 19.50c, 2000 lb to c.l. 20.50c, less than 2000 lb 21c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works. Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.68 in all sizes except powdered which is $1.74.

Technical Molybdic-Oxide: Per lb contained Mo, in cans, $1.39; in bags, $1.38, f.o.b. Langeloth and Washington, Pa.

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offer these advantages

Improved product appearance . . .

You can design with unrestricted imagination when you plan to use metal stampings for parts or complete assemblies. Simple and complex forms can be combined in a single stamping to add new beauty . . . increase functional efficiency . . . reduce production operations.

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Scrap Market Undertone Stronger

Upturn in prices continuing at some points. Index on steel grades up another 67 cents to $45.00. Trend over coming weeks uncertain with steel rate still slipping

Scrap Prices, Page 256

Chicago — While a somewhat stronger tone prevails in the scrap market, counter influences are limiting price increases to selected grades, and to $1 or $2 a ton. Supporting the upward pressure is the reduced volume of incoming scrap because of heavy rains throughout the area and heavier broker buying to fill old orders.

Detroit — Scrap prices are unchanged here. While the local market continues firm, brokers don't expect it to go much higher in the near future.

Pittsburgh—Mill buying has declined, but brokers are actively filling old orders. Prices on the major grades are unchanged. Collections increased with the rise in quotations a week ago, and brokers can fill their orders without difficulty. Railroad grades are firmer. No. 1 railroad heavy melting scrap is up $3 a ton, to $51. Stainless scrap has strengthened slightly on recent purchases.

Cleveland—Although the market undertone is slightly firmer, it is largely a sentimental reflection of returning strength at some other points. Industrial scrap tonnage this month is expected to be off somewhat, and this may be a factor for strength. At the same time, the continued decline in steelmaking operations injects a depressing note.

Philadelphia—Domestic prices on prime grades of open-hearth scrap have been advanced to $50, delivered, on the basis of latest sales.

These changes affect No. 1 heavy melting, No. 1 bundles and No. 1 busheling. Prices on No. 2 heavy melting and No. 2 bundles are unchanged, but buoyant, as the general market undertone is strong. This also is true of most other steel grades, though low phos structurals and plates (at $52-$54, delivered) and couplers, springs and wheels (at $58.50, delivered) have already advanced to higher ground.

New York—Brisk demand from domestic and foreign sources is forcing steel scrap prices higher. Brokers have increased their buying prices $2 a ton on No. 1 heavy melting and No. 1 bundles to $45-$46; similarly on No. 2 heavy melting to $35-$36. They are paying $1 more for No. 2 bundles, offering $31-$32.

They also have advanced their prices $1 on machine shop turnings to $24-$25 and mixed borings and turnings $1 to $28-$29. Short shovel turnings are up more than $1 at $29-$29.50. Low phos structurals and plate have been advanced $1 to $47-$48. Cast iron grades are unchanged.

Weakness in nickel bearing stainless steel continues, with little business going to test the market.

Boston—Prices are stronger in

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for better quality control

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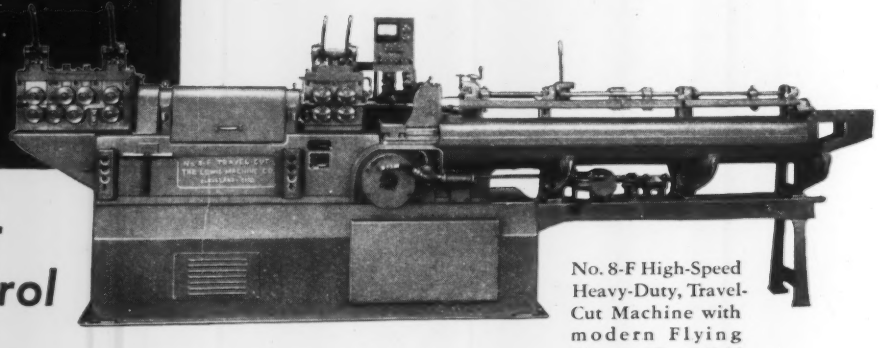

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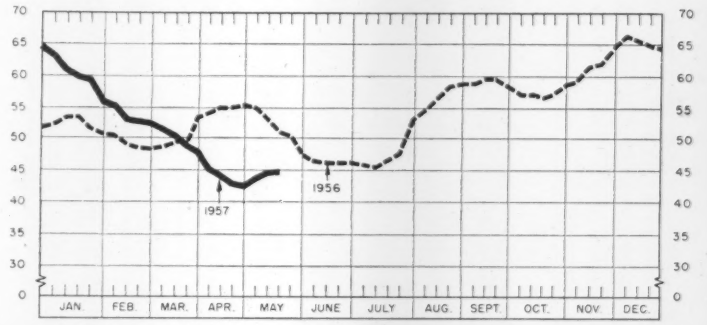
STEELMAKING SCRAP PRICE COMPOSITE

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania—Compiled by STEEL



May 15 1957	Week Ago	Month Ago	Year Ago	April Avg.
$45.00	$44.33	$42.67	$51.00	$43.57

this market. No. 1 heavy melting has been advanced $1.50 a ton, shipping point, brokers' buying price. Also higher are No. 1 bundles, No. 1 busheling and machine shop turnings.

Buffalo—A clearly defined scrap price trend is lacking here. On the bearish side are the decline in steel production and the drop in consumption. On the bullish side is a tight scrap supply situation.

Cincinnati—Scrap prices are firm despite continued dull demand. No. 1 heavy melting steel is quoted $37-$38, broker's buying price.

Birmingham—The scrap market is stronger. Some prices have advanced. An Atlanta mill bought No. 2 steel at $38 for local material and $41 for remote shipments. This was an average of $2.50 more per ton than its last buy. Some electric furnace grades also are up.

St. Louis—With mill demand increasing, the scrap market is stronger. However, shortages of metal prevent the full improvement from showing up in prices. Brokers hiked buying prices of some railroad items as much as $5. The same is happening to a lesser extent in heavy melting steel, posted prices on that grade being up $1.50 to $2.

Prices of cast iron grades are up for the first time in several months.

Los Angeles — Depressed mill buying of scrap continues. The market undertone is soft. Prices are holding at the recently reduced levels, but further downward adjustments are expected later.

San Francisco — Steelmaking operations have advanced slightly, giving support to the belief that scrap prices have about touched bottom.

Seattle — Prices are holding at the levels established earlier this month. Receipts are about equal to demand.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

13,500 tons, state bridge work, Brooklyn-Queens expressway, New York, through Gall Contracting Co. Inc. and Horn Construction Co., acting jointly in the general contract, to American Bridge Division, U.S. Steel Corp., Pittsburgh.

2975 tons, state highway bridges, Rensselaer and Columbia counties, New York, to Phoenix Bridge Co., Phoenixville, Pa., through Lane Construction Co., Meriden, Conn.

2070 tons, shop buildings, Waterbury Farrel Foundry & Machine Co., Cheshire, Conn., to Groisser & Shlager Iron Works, Somerville, Mass., through George A. Fuller Co., Boston, general contractor.

1900 tons, superstructure, three viaducts, Washington Memorial parkway, Arlington county, Va., to Atlas Machine & Iron Works, Arlington, Va.; Blackwell Engineering Co., Merrifield, Va., general contractor.

1820 tons, power plant, West Penn Power Co., Reesdale, Pa., through Sanderson & Porter, New York, to Fort Pitt Bridge Works, Pittsburgh.

1100 tons, state bridge, Sullivan county, New York, through Arboria Contracting Co., Poughkeepsie, N.Y., general contractor to Phoenix Bridge Co., Phoenixville, Pa.

900 tons, central services building, Norton Co., Worcester, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; Swanson & Janson Co., Worcester, general contractor.

940 tons, office building, Paul Revere Life Insurance Co., Worcester, Mass., to A. O. Wilson Structural Co., Cambridge, Mass.; George A. Fuller Co., Boston, general contractor.

445 tons, county courthouse, York, Pa., to the Carew Steel Co., York.

360 tons, stores division building, Queens hospital, New York, through Grayco Builders, general contractor, to Pecker Iron Works.

(*Please turn to page* 261)

Arrangements have been made through the undersigned for the placement of these Shares privately for investment. They have not been and are not being offered for sale to the public. This announcement appears as a matter of record only.

NEW ISSUE

$2,000,000

Antillian Steel Corporation

(Havana, Cuba)

Class "B" Capital Stock

Kidder, Peabody & Co.

Incorporated

May 9, 1957.

Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, May 15, 1957. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

May 15	$45.00
May 8	44.33
Apr. Avg.	43.57
May 1956	50.34
May 1952	43.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	44.00-45.00
No. 2 heavy melting	41.00-42.00
No. 1 factory bundles	49.00-50.00
No. 1 dealer bundles	44.00-45.00
No. 2 bundles	39.00-40.00
No. 1 busheling	44.00-45.00
Machine shop turnings	31.00-32.00
Mixed borings, turnings	31.00-32.00
Short shovel turnings	35.00-36.00
Cast iron borings	35.00-36.00
Cut structurals, 3 ft lengths	51.00-52.00
Cut structurals, 2 ft and under	52.00-53.00
Heavy turnings	41.00-42.00
Punchings & Plate scrap	51.00-52.00
Electric furnace bundles	51.00-52.00

Cast Iron Grades

No. 1 cupola	44.00-45.00
Heavy breakable cast	42.00-43.00
Unstripped motor blocks	34.00-35.00
No. 1 machinery cast	51.00-52.00

Railroad Scrap

No. 1 R.R. heavy melt.	*50.00-51.00*
Rails, 2 ft and under	66.00-67.00
Rails, 18 in. and under	67.00-68.00
Rails, random lengths	60.00-61.00
Railroad specialties	61.00-62.00

Stainless Steel Scrap

18-8 bundles & solids	*290.00-300.00*
18-8 turnings	*190.00-210.00*
430 bundles & solids	75.00-80.00
430 turnings	55.00-60.00

CLEVELAND

No. 1 heavy melting	38.00-39.00
No. 1 factory bundles	44.50-45.50
No. 2 heavy melting	36.00-37.00
No. 1 bundles	38.00-39.00
No. 2 bundles	32.00-33.00
No. 1 busheling	38.00-39.00
Machine shop turnings	20.00-21.00
Short shovel turnings	23.00-24.00
Mixed borings, turnings	23.00-24.00
Cast iron borings	23.00-24.00
Cut foundry steel	43.00-44.00
Cut structurals, plates 2 ft and under	48.00-49.00
Low phos. punchings & plate	42.00-43.00
Alloy free, short shovel turnings	26.00-27.00
Electric furnace bundles	42.00-43.00

Cast Iron Grades

No. 1 cupola	48.00-49.00
Charging box cast	37.00-38.00
Heavy breakable cast	37.00-38.00
Stove plate	*45.00-46.00*
Unstripped motor blocks	30.00-31.00
Brake shoes	37.00-38.00
Clean auto cast	*48.00-49.00*
Burnt cast	35.00-36.00
Drop broken machinery	50.00-51.00

Railroad Scrap

No. 1 R.R. heavy melt.	48.00-49.00
R.R. malleable	*56.00-57.00*
Rails, 2 ft and under	69.00-70.00
Rails, 18 in. and under	*70.00-71.00*
Rails, random lengths	*64.00-65.00*
Cast steel	55.00-56.00
Railroad specialties	59.00-60.00
Uncut tires	58.00-59.00
Angles, splice bars	59.00-60.00
Rails, rerolling	67.00-68.00

Stainless Steel
(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	*300.00-310.00*
18-8 turnings	*200.00-210.00*
430 clips, bundles, solids	75.00-80.00
430 turnings	40.00-50.00

YOUNGSTOWN

No. 1 heavy melting	*43.00-44.00*
No. 2 heavy melting	*40.00-41.00*
No. 1 bundles	*43.00-44.00*
No. 2 bundles	*36.00-37.00*
No. 1 busheling	*45.00-46.00*
Machine shop turnings	20.00-21.00
Short shovel turnings	23.00-24.00
Cast iron borings	23.00-24.00
Low phos.	45.00-46.00
Electric furnace bundles	45.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	*50.00-51.00*

CHICAGO

No. 1 hvy melt. indus.	*41.00-42.00*
No. 1 hvy melt. dealer	*39.00-40.00*
No. 2 heavy melting	*36.00-37.00*
No. 1 factory bundles	*45.00-46.00*
No. 1 dealer bundles	*40.00-41.00*
No. 2 bundles	32.00-33.00
No. 1 busheling, indus	*41.00-42.00*
No. 1 busheling, dealer	*39.00-40.00*
Machine shop turnings	23.00-24.00
Mixed borings, turnings	25.00-26.00
Short shovel turnings	25.00-26.00
Cast iron borings	25.00-26.00
Cut structurals, 3 ft.	*47.00-48.00*
Punchings & plate scrap	*48.00-49.00*

Cast Iron Grades

No. 1 cupola	*40.00-41.00*
Stove plate	*37.00-38.00*
Unstripped motor blocks	*30.00-31.00*
Clean auto cast	*45.00-46.00*
Drop broken machinery	*45.00-46.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*47.00-48.00*
R.R. malleable	53.00-54.00
Rails, 2 ft and under	*59.00-60.00*
Rails, 18 in. and under	*60.00-61.00*
Angles, splice bars	*53.00-54.00*
Rails, rerolling	*58.00-59.00*

Stainless Steel Scrap

18-8 bundles & solids	*310.00-315.00*
18-8 turnings	*210.00-215.00*
430 bundles & solids	75.00-80.00
430 turnings	50.00-55.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	26.00-27.00
No. 1 bundles	36.00-37.00
No. 2 bundles	25.00-26.00
No. 1 busheling	34.00-35.00
Machine shop turnings	23.00-24.00
Mixed borings, turnings	24.00-25.00
Short shovel turnings	24.00-25.00
Punchings & plate scrap	42.00-43.00

Cast Iron Grades

No. 1 cupola	45.00
Charging box cast	38.00
Stove plate	41.00
Heavy breakable	36.00
Unstripped motor blocks	24.00
Clean auto cast	47.00
Malleable	52.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*41.00*
No. 2 heavy melting	37.00
No. 1 bundles	*41.00*
No. 2 bundles	32.00
No. 1 busheling	*41.00*
Machine shop turnings	24.00
Short shovel turnings	27.00

Cast Iron Grades

No. 1 cupola	43.00
Charging box cast	*37.00*
Heavy breakable cast	*37.00*
Unstripped motor blocks	*37.00*
Brake shoes	40.00
Clean auto cast	48.00
Stove plate	39.00

Railroad Scrap

No. 1 R.R. heavy melt.	43.50
Rails, 18 in. and under	*61.00*
Rails, rerolling	*64.00*
Rails, random lengths	*59.00*
Angles, splice bars	*56.00*

PHILADELPHIA

No. 1 heavy melting	*50.00*
No. 2 heavy melting	41.00
No. 1 bundles	*50.00*
No. 2 bundles	39.00
No. 1 busheling	*50.00*
Electric furnace bundles	51.00
Mixed borings, turnings	32.00-33.00
Short shovel turnings	36.50-37.50
Machine shop turnings	33.50
Heavy turnings	45.00
Structural & plate	*52.00-54.00*
Couplers, springs, wheels	*58.50*
Rail crops, 2 ft & under	65.00-66.00

Cast Iron Grades

No. 1 cupola	42.00-44.00
Heavy breakable cast	54.00
Malleable	62.00†
Drop broken machinery	54.00-56.00

†Nominal

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*45.00-46.00*
No. 2 heavy melting	*35.00-36.00*
No. 1 bundles	*45.00-46.00*
No. 2 bundles	*31.00-32.00*
Machine shop turnings	24.00-25.00
Mixed borings, turnings	*28.00-29.00*
Short shovel turnings	*29.00-29.50*
Low phos. (structurals & plate)	*47.00-48.00*

Cast Iron Grades

No. 1 cupola	41.00-42.00
Unstripped motor blocks	32.00-33.00
Heavy breakable	45.00-46.00

Stainless Steel

18-8 sheets, clips solids	*305.00*
18-8 borings, turnings	*200.00*
430 sheets, clips, solids	60.00-70.00
410 sheets, clips, solids	50.00-60.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*36.00-37.00*
No. 2 heavy melting	29.50-31.00
No. 1 bundles	*36.00-37.00*
No. 2 bundles	*27.00-28.00*
No. 1 busheling	*36.00-37.00*
Machine shop turnings	*21.00-22.00*
Mixed borings, turnings	22.50-23.50
Short shovel turnings	*25.00-26.00*
No. 1 cast	34.00-35.00
Mixed cupola cast	33.00-34.00
No. 1 machinery cast	42.00-43.00

BUFFALO

No. 1 heavy melting	40.00-41.00
No. 2 heavy melting	36.00-37.00
No. 1 bundles	40.00-41.00
No. 2 bundles	33.00-34.00
No. 1 busheling	40.00-41.00
Mixed borings, turnings	29.00-30.00
Machine shop turnings	27.00-28.00
Short shovel turnings	30.00-31.00
Cast iron borings	29.00-30.00
Low phos.	44.00-45.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	39.00-40.00
No. 1 machinery	44.00-45.00

Railroad Scrap

Rails, random lengths	53.00-54.00
Rails, 3 ft and under	59.00-60.00
Railroad specialties	47.00-48.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	37.00-38.00
No. 2 heavy melting	33.00-34.00
No. 1 bundles	37.00-38.00
No. 2 bundles	30.00-31.00
No. 1 busheling	37.00-38.00
Machine shop turnings	25.00-26.00
Mixed borings, turnings	23.00-24.00
Short shovel turnings	27.00-28.00
Cast iron borings	23.00-24.00
Low phos. 18 in.	49.00-50.00

Cast Iron Grades

No. 1 cupola	43.00-44.00
Heavy breakable cast	42.00-43.00
Charging box cast	42.00-43.00
Drop broken machinery	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt.	41.00-42.00
Rails, 18 in. and under	64.00-65.00
Rails, random lengths	54.00-55.00

BIRMINGHAM

No. 1 heavy melting	*39.00-40.00*
No. 2 heay melting	*33.00-34.00*
No. 1 bundles	*39.00-40.00*
No. 2 bundles	26.00-27.00
No. 1 busheling	*39.00-40.00*
Cast iron borings	26.00-27.00
Short shovel turnings	*30.00-31.00*
Machine shop turnings	*28.00-29.00*
Bar crops and plate	*47.00-48.00*
Structurals & plate	*46.00-47.00*
Electric furnace bundles	*45.50-46.50*
Electric furnace:	
3 ft and under	*43.50-44.50*
2 ft and under	*44.50-45.50*

(F.o.b. shipping point)
Cast Iron Grades

No. 1 cupola	47.50-48.50
Stove plate	47.00-48.00
Unstripped motor blocks	38.00-39.00
Charging box cast	34.00-35.00
No. 1 wheels	37.00-38.00

Railroad Scrap

No. 1 R.R. heavy melt.	*41.00-42.00*
Rails, 18 in. and under	*56.00-57.00*
Rails, rerolling	*60.00-61.00*
Rails, random lengths	*50.00-51.00*
Angles, splice bars	*53.00-54.00*

SEATTLE

No. 1 heavy melting	48.00
No. 2 heavy melting	45.00
No. 1 bundles	45.00
No. 2 bundles	26.00-28.00
Machine shop turnings	28.00-30.00
Mixed borings, turnings	28.00-30.00
Electric furnace No. 1	56.00

Cast Iron Grades

No. 1 cupola	50.00
Heavy breakable cast	48.00
Unstripped motor blocks	40.00
Stove plate (f.o.b. plant)	42.00

LOS ANGELES

No. 1 heavy melting	46.00
No. 2 heavy melting	43.00
No. 1 bundles	47.00
No. 2 bundles	33.00
Machine shop turnings	32.00
Shoveling turnings	33.00
Cast iron borings	34.00
Cut structural and plate, 1 ft and under	57.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	54.00

Railroad Scrap

No. 1 R.R. heavy melt.	48.00

SAN FRANCISCO

No. 1 heavy melting	48.00
No. 2 heavy melting	43.00
No. 1 bundles	47.00
No. 2 bundles	35.00
Machine shop turnings	32.00
Mixed borings, turnings	32.00
Cast iron borings	32.00
Heavy turnings	32.00
Short shovel turnings	34.00
Cut structurals, 3 ft	60.00

Cast Iron Grades

No. 1 cupola	55.00
Charging box cast	47.00-49.00
Stove plate	48.00
Heavy breakable cast	42.00
Unstripped motor blocks	50.00
Clean auto cast	57.00
No. 1 wheels	50.00
Drop broken machinery	55.00

HAMILTON, ONT.

No. 1 heavy melting	43.00
No. 2 heavy melting	38.00
No. 1 bundles	43.00
No. 2 bundles	32.00
Mixed steel scrap	35.00
Mixed borings, turnings	19.00
Busheling, new factory: Prepared	43.00
Unprepared	37.00
Short steel turnings	30.00
Rails, rerolling	49.00

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b. Hamilton, Ont.

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Support Pressures Grow

Sagging demand for lead and zinc is forcing producers to petition Congress for help. The U.S. has committed itself in the past. The question: Will it continue to do so?

Nonferrous Metal Prices, Pages 260 & 261

THE POWER play is on. Lead and zinc spokesmen are putting all the pressure they can muster on Washington to get the barter program going again.

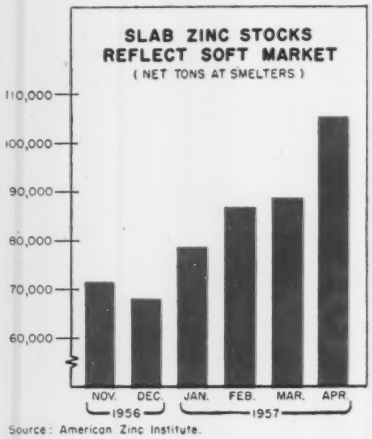
Clinton R. Crane, retiring chairman, St. Joseph Lead Co., told stockholders last week: "It is conceivable that if the U.S. stops the barter program before developing a long range system to replace it, St. Joseph will have to stockpile it own metals."

Lead, Zinc—Both metals have been partially dependent on government stockpile and barter arrangements (excess American grain for foreign origin lead and zinc) to keep world markets healthy.

The sudden cutoff of barter buying and the phase-out of the stockpile purchase plan have brought about great uncertainty in the markets, especially for zinc. On May 6, the price dropped abruptly from 13.50 cents a pound to 12. Then after some effort to hold the line, primary producers dipped to 11.5 cents, joining custom smelters who instituted the level a couple of days prior to that. Meanwhile, lead prices were cut a half cent on May 9 and last week faced the possibility of further decline. Buyers are sitting back and waiting for both metals to establish their levels.

Prospects—The lead and zinc industries will probably get government assistance in the near future. But the battle will rage on how it should be done. American producers will fight for some type of stockpiling program for the domestic market. Mine state representatives and senators will agree. The rest of Congress may decide that getting rid of agricultural surpluses, while taking excess lead and zinc from foreign markets, is the best approach. Contend some domestic lead and zinc men: The barter program is bringing in mine production in foreign areas which would be closed if the U.S. pulled out the props.

U.S. zinc stocks at the end of April (105,599 tons) were the highest since January, 1955. Domestic deliveries dropped from 67,441 tons in March to 55,182 tons in April.



Source: American Zinc Institute.

Copper Sales Gain

Foreign copper demand is good to excellent. American producers, selling on an average price quotation, are finding plenty of customers.

American users are still reluctant buyers, but producers are reporting a gradual improvement in sales. Reports one: "Brass mill customers are placing spot orders. This forces mills to order the same way."

Hot Metal Deals Gain?

Look for more discussions on the pros and cons of aluminum hot metal contracts. Selling this way enables primary producers to offer a die-cast grade which is more competitively priced with secondary die-cast grades.

Some pros: 1. It helps obtain additional revenue for expansion, softens bankers when a producer can guarantee that "X" tons have already been sold on long term contracts. 2. It gives the supplier an "in" when any further aluminum is needed.

A few questions being raised: 1. What happens if the foundry being supplied is struck and there is no place to send the hot metal? 2. How ironclad are the long term contracts? 3. Can hot metal be sold to one customer at a reduced rate?

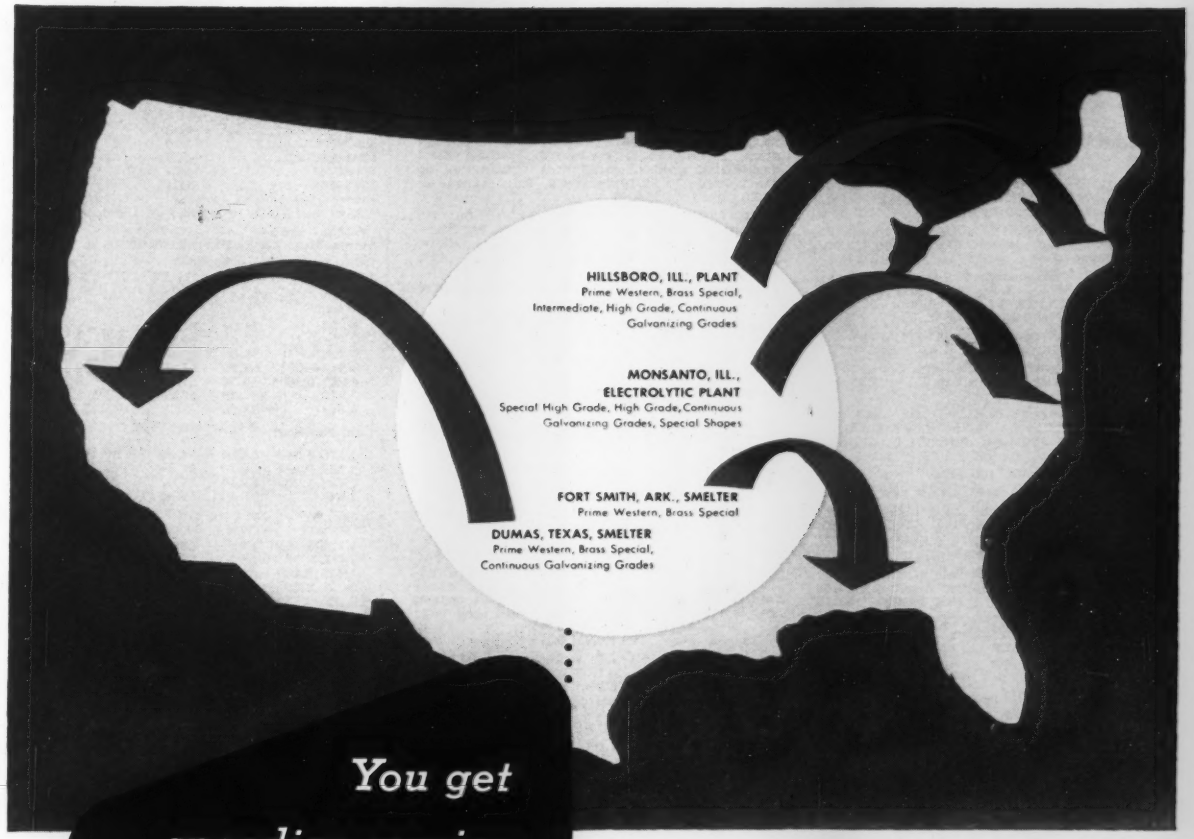
Only one primary aluminum producer has initiated such contracts. If he has success in getting additional deals (particularly with automotive companies), look for the other primary producers to jump on the band wagon.

Aluminum demand is about the same. There is still some price hedging on mill products.

NONFERROUS PRICE RECORD

	Price May 15	Last Change	Previous Price	Apr. Avg.	Mar. Avg.	May, 1956 Avg.
Aluminum	27.10	Aug. 10, 1956	25.90	27.100	27.100	25.900
Copper	30.00–32.00	May 9, 1957	30.50–32.00	31.593	31.462	45.096
Lead	15.30	May 9, 1957	15.80	15.800	15.800	15.800
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	33.750
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	64.500
Tin	98.50	May 14, 1957	98.00	99.276	99.683	97.024
Zinc	11.50	May 14, 1957	11.50–12.00	13.500	13.500	13.500

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.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Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots, 27.10; pigs, 25.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.90; No. 43, 28.70; No. 195, 30.30; No. 241, 30.50; No. 356, 28.90, 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.35 per lb for 550-lb keg; $2.37 per lb for 100-lb case; $2.42 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 32.00 deld. Conn. valley; 32.00 deld. Midwest; custom smelters, 30.50 deld.; lake, 32.00 deld.; fire refined, 31.75 deld.

Germanium: First reduction $201.85-220 per lb; intrinsic grade, $220-242.67 per lb, depending on quantity.

Gold: U.S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $100-110 nom. per troy oz.

Lead: Common, 15.30; chemical, 15.40; corroding, 15.40, St. Louis. New York basis, add 0.20.

Lithium: 98+%, cups or ingots, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 35.25; ingot, 36.00, f.o.b. Velasco, Tex., 13 in. sticks, 59.00, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91B (diecasting), 37.25 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $255-257 per 76-lb flask.

Molybdenum: Extruded ingot, $9.60 per pound, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot or ingots for addition to cast iron, 74.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01.

Osmium: $80-100 per troy oz, nom.

Palladium: $23-24 per troy oz.

Platinum: $92-95 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $118-125 per troy oz.

Ruthenium: $45-55 per troy oz.

Selenium: 99.5%, $12-15 per lb.

Silver: Open market, 91.375 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.65 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N.Y., spot and prompt, 98.50.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max.), $2.75; grade A-2 (0.5% Fe max.), $2.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.00 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $4.75.

Zinc: Prime Western, 11.50; brass special, 11.75; intermediate, 12.00; East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 12.85; special high grade, 13.25 deld. Die casting alloy ingot No. 3, 15.50; No. 2, 16.50; No. 5, 16.00 deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $10 per lb; reactor grade, $14-22 per lb depending on quantity. Powder electronics grades, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 23.00-28.75; No. 12 foundry alloy (No. 2 grade), 21.00-22.50; 5% silicon alloy, 0.60 Cu max., 24.00-25.00; 13 alloy, 0.60 Cu max., 24.00-25.00; 195 alloy, 23.75-25.75; 108 alloy, 21.50-22.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 22.75; grade 2, 21.00; grade 3, 20.00; grade 4, 19.25.

Brass Ingot: Red brass, No. 115, 31.50; tin bronze, No. 225, 40.50; No. 245, 35.50; high-leaded tin bronze, No. 305, 35.50; No. 1 yellow, No. 405, 25.25; manganese bronze, No. 421, 28.50.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 37.50; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.83-1.86, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.80, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 37.355; l.c.l., 37.98. Weatherproof, 30,000-lb lots, 37.78; l.c.l., 38.53. Magnet wire deld., 15,000 lb or more, 44.68; l.c.l., 45.43.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $21.00 per cwt; pipe, full coils, $21.00 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheets and strip, $11.00-14.75; sheared mill plate, $9.25-11.25; wire, $8.50-11.00; forging billets, $6.85-7.10; hot-rolled and forged bars, $7.10-7.35.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 24.00; ribbon zinc in coils, 21.00; plates, 19.50.

ZIRCONIUM

Plate, $20.35; H.R. strip, $23.95; C.R. strip, $32.00; forged or H.R. bars, $18.40; wire, 0.015 in., 8.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheet and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.249-0.138	40.90-45.40	....
0.135-0.096	41.40-46.50	37.70-39.60
0.095-0.077	42.10-48.30	37.80-39.80
0.076-0.061	42.70-50.60	38.20-40.50
0.060-0.048	43.40-52.90	38.80-41.50
0.047-0.038	43.90-55.60	38.60-42.90
0.037-0.030	44.30-50.00	40.40-44.70
0.029-0.024	44.90-52.40	41.00
0.023-0.019	45.80-52.20	42.00
0.018-0.017	46.50-53.30	42.60
0.016-0.015	47.50-53.90	43.40
0.014	48.50-50.90	44.40
0.013-0.012	49.70-52.10	45.10
0.011	50.70-53.70	46.30
0.010-0.0095	52.10-54.40	47.60
0.009-0.0085	53.40	49.10
0.008-0.0075	55.00	50.03
0.007	56.50	51.80
0.006	58.10	53.20

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	40.2	44.5
5050-F	41.3	45.6
3004-F	42.3	47.5
5052-F	42.9	48.2
6061-T6	44.4	50.0
2024-T4*	48.1	54.4
7075-T6*	55.4	62.5

*24-48 in. width or diam., 72-180 lengths.

Screw Machine Stock: 30,000 lb base.

Diam.(in.)or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	74.30	71.50	....	....
0.156-0.172	63.00	60.40	....	....
0.188	63.00	60.40	....	76.40
0.219-0.234	59.70	57.20	....	....
0.250-0.281	59.70	57.20	....	73.00
0.313	59.70	57.20	....	69.60
0.344	58.50	....	....	....
Cold-Finished				
0.375-0.547	58.80	57.50	70.10	65.50
0.563-0.688	58.80	57.50	66.70	61.60
0.750-1.000	57.40	56.00	61.00	58.10
1.063	57.40	56.00	....	56.10
Rolled				
1.125-1.500	55.20	53.90	59.00	56.10
1.563	53.70	52.40	....	....
1.625-2.000	53.10	51.60	....	....
2.125-2.500	51.70	50.30	....	....
2.563-3.375	50.20	48.70	....	....

Forging Stock: Round, Class 1, 43.30-55.90 in specific lengths, 36-144 in., diam. 0.375-8 in. Rectangles and squares, Class 1, 48.10-63.20 in random lengths, 0.375-4 in. thick, width 0.0750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
⅜	$18.45	2	$ 57.00
1	29.00	4	157.20
1¼	39.25	6	281.65
1½	46.95	8	423.80

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	43.10-44.60	57.80-61.80
12-14	43.40-44.80	58.40-62.70
15-17	43.60-45.40	59.60-64.30
18-20	44.10-45.80	61.50-66.80

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Thread plate, .188 in., 71.70; .250-2.00 in., 70.60. Tooling plates, .250-3.0 in., 73.0.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots.)

Aluminum: 1100 clippings, 13.00-13.50; old sheets, 9.50-10.00; borings and turnings, 6.50-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f	
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	54.13b	51.36c	....	54.32	28.000	28.000	27.250
Yellow Brass	47.02	35.16d	47.56	49.93	21.375	21.125	19.625
Low Brass, 80%	49.90	49.84	50.44	52.71	23.875	23.625	23.125
Red Brass, 85%	50.92	50.86	51.46	53.73	24.875	24.625	24.125
Com. Bronze, 90%	52.48	52.42	53.02	55.04	25.750	25.500	25.500
Manganese Bronze	54.82	48.97	59.44	....	19.875	19.625	19.125
Muntz Metal	49.19	45.00	....	....	20.125	19.875	19.375
Naval Brass	51.10	45.41	58.16	54.51	19.875	19.625	19.125
Silicon Bronze	58.60	57.79	58.64	60.68e	27.375	27.125	26.375
Nickel Silver, 10%	63.68	66.01g	66.01	....	27.875	27.625	13.938
Phos. Bronze, A-5%	73.17	73.67	73.67	74.85	28.875	28.625	27.625

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

7.00; crankcases, 9.50-10.00; industrial castings, 9.50-10.00.

Copper and Brass: No. 1 heavy copper and wire, 23.00-23.50; No. 2 heavy copper and wire, 21.50-22.00; light copper, 19.75-20.25; No. 1 composition red brass, 20.50-21.00; No. 1 composition turnings, 20.00-20.50; yellow brass turnings, 11.50-12.00; new brass clippings, 19.00-19.50; light brass, 12.00-12.50; heavy yellow brass, 14.00-14.50; new brass rod ends, 16.50-17.00; auto radiators, unsweated, 15.00-15.50; cocks and faucets, 16.50-17.00; brass pipe, 17.00-17.50.

Lead: Heavy, 11.00-11.50; battery plates, 6.00-6.25; linotype and stereotype, 13.00-13.50; electrotype, 12.50-13.00; mixed babbitt, 12.00-12.50.

Monel: Clippings, 50.00-55.00; old sheets, 50.00-55.00; turnings, 45.00-50.00; rods, 50.00-55.00.

Nickel: Sheets and clips, 85.00-100.00; rolled anodes, 85.00-100.00; turnings, 75.00-80.00; rod ends, 85.00-100.00.

Zinc: Old zinc, 3.00-3.50; new die-cast scrap, 2.50; old die-cast scrap, 1.25-1.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 16.50; 3003 clippings, 16.50; 6151 clippings, 16.50; 5052 clippings, 16.00-16.50; 2014 clippings, 15.50-16.00; 2017 clippings, 15.50-16.00; 2024 clippings, 15.50-16.00; mixed clippings, 15.00; old sheets, 13.00-13.50; old cast, 13.00-13.50; clean old cable (free of steel), 15.50-16.50; borings and turnings, 13.50-14.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 54.00; light scrap, 49.00; turnings and borings, 34.00.

Copper and Brass: No. 1 heavy copper and wire, 26.25; No. 2 heavy copper and wire, 24.25; light copper, 22.00; refinery brass (60% copper) per dry copper content, 23.50.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 26.25; No. 2 heavy copper and wire, 24.25; light copper, 22.00; No. 1 composition borings, 22.50; No. 1 composition solids, 23.00 **heavy yellow brass solids,** 17.00; yellow brass turnings, 16.00; radiators, 17.75.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 50.29; oval, 49.42, 5000-10,000 lb; electrodeposited, 39.25, 2000-5000 lb lots; cast, 44.00, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 101.50; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 116.50; 200-499 lb, 115.00; 500-999 lb, 114.50; 1000 lb or more, 114.00.

Zinc: Balls, 18.59; flat tops, 18.25; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb, in 100-lb drums.
Chromic Acid: 100 lb, 33.30; 500 lb, 32.80; 2000 lb, 32.15; 5000 lb, 31.80; 10,000 lb, 31.30, f.o.b. Detroit.

Copper Cyanide: 100-1000 lb, 77.50.

Copper Sulphate: 100 lb, 24.35; 200 lb, 21.35; 300 lb, 20.35; 400 lb, 19.85; 500 lb, 18.35; 2000 lb, 16.10; 6000 lb, 15.85; 12,000 lb, 15.60, f.o.b. shipping point.

Nickel Chloride: 100 lb, 48.50; 200 lb, 46.50; 300 lb, 45.50; 400 lb, 43.50; 5000 lb, 41.50; 10,000 lb, 40.50.

Nickel Sulphate: 100 lb, 40.50; 200 lb, 38.50; 300 lb, 37.50; 400 lb, 35.50; 5000 lb, 33.50; 20,000 lb, 33.00; 36,000 lb, 32.50.

Sodium Cyanide: 100 lb, 27.50; 200 lb, 25.80; 400 lb, 22.80; 1000 lb, 21.80, f.o.b. Detroit.
Sodium Stannate: Less than 100 lb, 77.40; 100-600 lb, 68.20; 700-1900 lb, 65.50; 2000-9900 lb, 63.60; 10,000 lb or more, 62.30.

Stannous Chloride (anhydrous): Less than 25 lb, 167.10; 25 lb, 132.10; 100 lb, 117.10; 400 lb, 114.70; 5200-19,600 lb, 102.50; 20,000 lb or more, 90.30.

Stannous Sulphate: Less than 50 lb, 129.80; 50 lb, 99.80; 100-1900 lb, 97.80; 2000 lb or more, 95.80.

Zinc Cyanide: Under 1000 lb, 55.55; 1000 lb and over, 53.55.

(*Concluded from page 255*)

Long Island, N.Y.

320 tons, bag plant, International Paper Co., Litchfield, Ill., to an unnamed fabricator.

300 tons, new plant at The Dalles, Oreg., for Harvey Aluminum Co., to Pacific Car & Foundry Co., Seattle; additional contracts awarded California fabricators.

REINFORCING BARS . . .

REINFORCING BARS PLACED

940 tons, piers and superstructures, three viaducts, Washington Memorial parkway, Arlington county, Va., to Hudson Supply Co., Washington; Blackwell Engineering Co., Merrifield, Va., general contractor.

500 tons, estimated, substructure, fruit pier, Baltimore & Ohio railroad, Baltimore, to Bethlehem Steel Co., Bethlehem, Pa.; McLean Contracting Co., Baltimore, general contractor.

360 tons, state highway structures, Albany county, N.Y., to Northeastern Steel Corp., Bridgeport, Conn.; Westcott Construction Co., North Attleboro, Mass., general contractor.

320 tons, off-base communications building, Westover AFB, Chicopee Falls, Mass., to Concrete Steel Co., Boston; Daniel O'Connell's Sons Inc., Holyoke, Mass., general contractor; 60 tons, structural steel, Haarmann Steel Co., Holyoke.

315 tons, central services building, Norton Co., Worcester, Mass., to Plantations Steel Co., Providence, R.I.; Swanson & Janson Co., Worcester, Mass., general contractor.

300 tons, structurals and bars, guided missile support facilities, naval mine depot, Yorktown, Va., to Richmond Structural Steel Co., Richmond, Va.; Doyle & Russell Co., Richmond, general contractor.

250 tons, shopping center, Food Fairs, Feasterville, Pa., to Manuel Greenberg.

275 tons, classroom building, Brown university, Providence, R. I., to A. O. Wilson Structural Co., Cambridge, Mass.; Gilbane Building Corp., Providence, general contractor.

225 tons, control tower, Newark, N.J., airport, to White Plains Iron Works Peekskill, N. Y.

270 tons, floor steel, aluminum plant, American Brass Co., Terre Haute, Ind., to Bethlehem Steel Co., Bethlehem, Pa.

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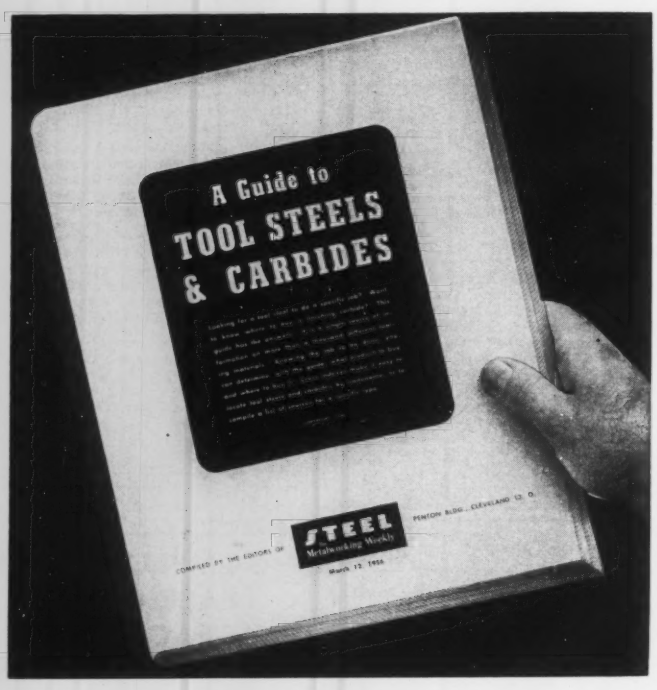

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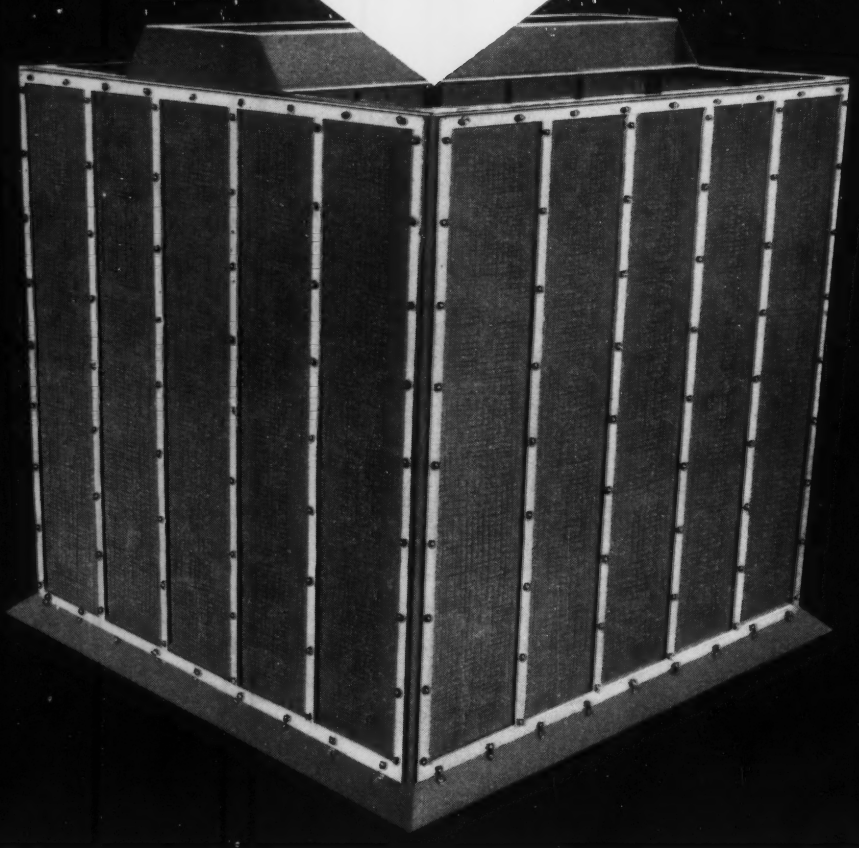


Here's how one company solved a tough corrosion problem in setting up a new method of extracting uranium from ores.

Frame members and the 35 mesh screen which covers five sides of these 48" cubical shaped dipping baskets are made of Carpenter Stainless No. 20 for super corrosion resistance.

The baskets are loaded with ion-exchange resin and agitated in a tank through which flows slime bearing sulphuric acid pulps containing uranium in solution. In this process, the uranium values are removed from the solution and retained in the resin. Later these uranium values are removed with a nitrate solution, then precipitated as a refined, high-grade salt.

Carpenter Stainless No. 20, available in 8 forms, is a proven material for super corrosion resistance in the nuclear energy field. Call your nearest Carpenter Distributor or talk to our mill specialists now.

MEMBER STEEL FOUNDERS' SOCIETY OF AMERICA STEEL FOUNDERS' SOCIETY RESEARCH INSTITUTE

The Carpenter Steel Company
Alloy Tube Division, Union, N. J.

Export Dept.: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

Carpenter

more than corrosion resistance

Stainless No. 20 and No. 20Cb

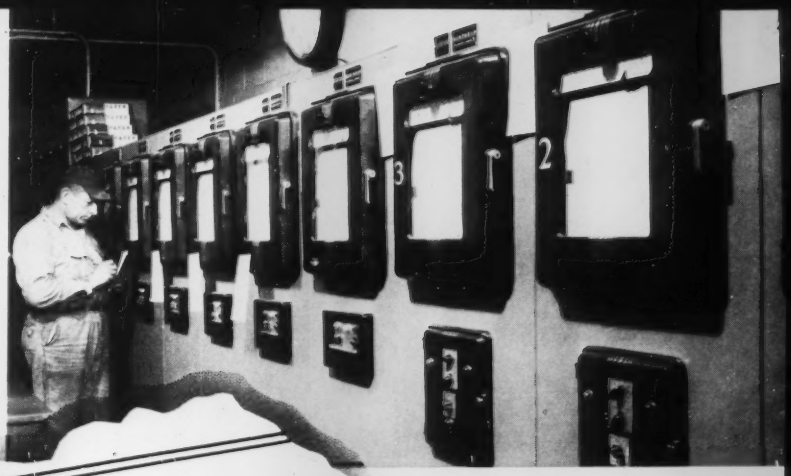
Carpenter No. 20 bars, strip, wire and billets are available also from The Carpenter Steel Company, Reading, Pa.

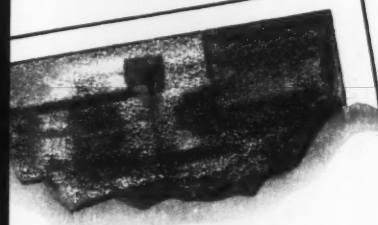
Allegheny Triples Chrome Stainless Annealing Facility

Six More Lee Wilson Single Stack Furnaces Set into Action

The ability of Lee Wilson engineers to work with steel mill metallurgists in the design and construction of annealing equipment for any application was reconfirmed recently when the Allegheny Ludlum Steel Corporation installed six additional Lee Wilson furnaces specially designed for annealing hot rolled stainless steels of the straight chrome variety.

Allegheny Ludlum, one of the nation's foremost stainless steel producers, wanted special furnace equipment that could withstand the stresses and strains encountered in rapid cooling.



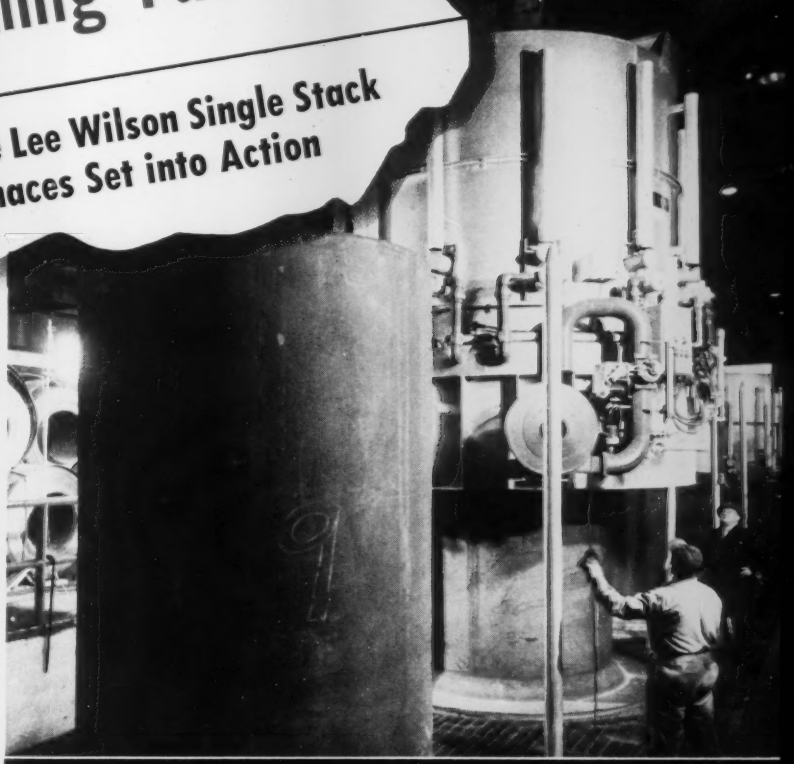


The stainless steel is brought up to a temperature of between 1525 and 1575 degrees, held for a short soak, and then both furnace and inner cover are removed. The fan is kept running. This results in an extra fast cooling.

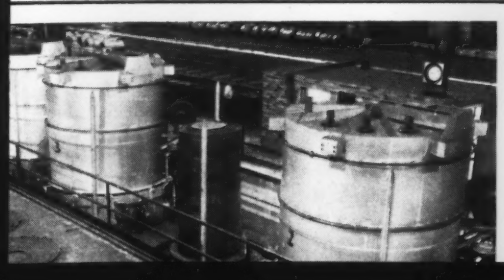
While this fast cooling is desirable from a steel production standpoint, the rapid contraction is responsible for tremendous strains on charge supporting furnace structures and convector plates. Lee Wilson engineers developed special structures and plates that successfully withstand this extra fast contraction.

A plus advantage to fast cooling is the added production possible when the necessity for slower controlled cooling is eliminated. This, naturally, increases the production possible per base.

If you have a particular annealing problem, be sure to talk with Lee Wilson engineers before you buy. *Literature upon request.*



Allegheny's decision to purchase additional Lee Wilson furnaces was based on a thorough test. Three years ago, Allegheny installed three Lee Wilson furnaces and five bases (see left) for this highly specialized work. After considerable testing, Allegheny engineers selected the Lee Wilson Single Stack Furnace for their additional needs.



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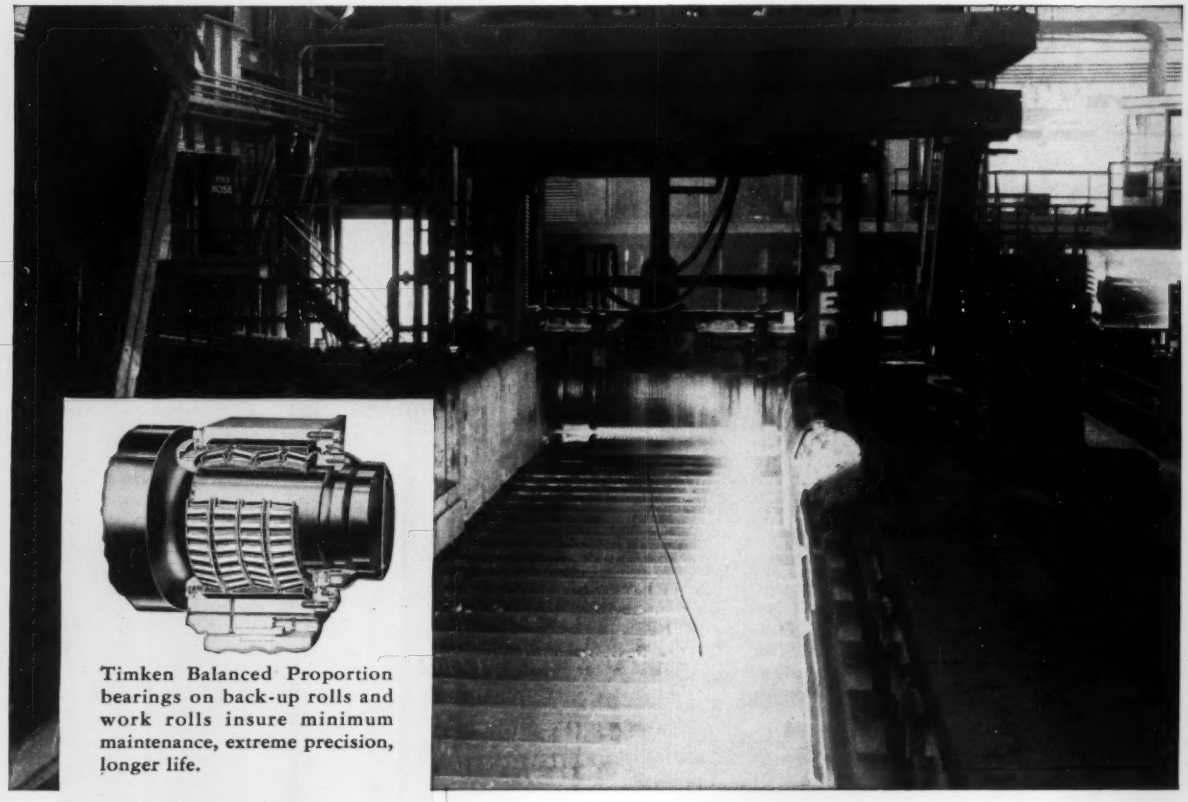

Timken Balanced Proportion bearings on back-up rolls and work rolls insure minimum maintenance, extreme precision, longer life.

2-high bloom and slab mill starts faster, drives easier on TIMKEN® balanced proportion bearings

WITH the roll necks on this 2-high bloom and slab mill—built by United Engineering & Foundry Company for Pittsburgh Steel's Monessen, Pa., plant—mounted on Timken® balanced proportion bearings, friction is practically eliminated. This means lower starting resistance, faster acceleration, easier roll drive and higher rolling speeds. And because the balanced proportion design of Timken bearings permits larger diameter roll necks with no increase in bearing O.D., roll neck strength is increased up to 60%—load ratings up to 40%.

No special thrust bearings are needed; Timken bearings take radial and thrust loads in any combination. And full line contact between the rollers and races of Timken bearings gives them extra load-carrying capacity. Complicated lubrication systems are eliminated, too; Timken bearings permit simple, economical grease lubrication. Rolls can be changed quickly and easily. Wear is greatly reduced, long life is assured. Timken bearings are designed geometrically to *roll true* . . . and are precision-manufactured, under the most rigid quality controls, to conform to their design. Timken bearings show lowest cost per ton of steel rolled.

Always specify Timken balanced proportion roll neck bearings. For full details, consult our roll neck specialists. Write to: The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

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